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A review of important forest insect and disease problems in the ESPANOLA DISTRICT of Ontario, 1950 - 1980

Compiled by

H. J. Weir, M. J. Thomson,
D. C. Constable and C. G. Jones

Miscellaneous Report No. 10

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THE GREAT LAKES FOREST RESEARCH CENTRE

The Great Lakes Forest Research Centre is one of six regional establishments located across Canada and operated by the Canadian Forestry Service. The overall objective of the Service is to promote the preservation, enhancement and wise use of a healthy, attractive and bountiful forest resource and terrestrial environment for the economic and social benefit of all Canadians. The Centre pursues this objective by conducting two major programs: research and technical services and forestry development. Both programs address major problems affecting forest management and the forest environment primarily in Ontario, but because of the transprovincial nature of the forest resource, many elements of our research program are of national significance.

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A REVIEW OF IMPORTANT FOREST INSECT AND DISEASE PROBLEMS IN THE ESPANOLA DISTRICT OF ONTARIO, 1950-1980

Compiled by

H.J. Weir, M.J. Thomson, D.C. Constable and C.G. Jones[1]

GREAT LAKES FOREST RESEARCH CENTRE
CANADIAN FORESTRY SERVICE
DEPARTMENT OF THE ENVIRONMENT
1984

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FOREWORD

The first forest insect surveys in Ontario were carried out in 1936 from the Dominion Entomological Laboratory in Ottawa and continued from this location until 1944, when the province of Ontario was divided, for the purpose of these surveys, into northern and southern Ontario. In 1945, personnel from Ottawa continued to conduct and report on surveys in the area south of the Algonquin Park and Parry Sound forest districts, while personnel from the Forest Insect Laboratory in Sault Ste. Marie carried out surveys in the area to the north. In 1950 responsibility for reporting insects for all of Ontario fell to the Sault Ste. Marie laboratory. In 1952 the Forest Disease Survey was initiated with headquarters in Maple, Ontario, then was moved to Sault Ste. Marie in 1967. The results of these surveys of insects and diseases are reported in the Annual Report of the Forest Insect and Disease Survey (FIDS) published by Canadian Forestry Service headquarters in Ottawa. In addition, annual district and regional reports, begun in 1948, are prepared by FIDS technicians (Rangers) in Sault Ste. Marie. In 1980 a new provincial report was released in Ontario. The contents of the following review have been abstracted from these reports and compiled in alphabetical order by the scientific names of species in each of the following three categories:

Major Insects or Diseases

Capable of causing serious injury to or death of living trees or shrubs.

Minor Insects or Diseases

Capable of causing sporadic or localized injury but not usually a serious threat to living trees or shrubs.

Abiotic Damage

Damage caused by non-living factors.

All measurements in this review are in metric form and conversions from Imperial measurements from the earliest reports are taken to the second decimal point, i.e., [sq. mi. to km^2 = area (sq. mi.) x 2.59 = area km^2]. Infestation maps in this review were copied from the original maps in the FIDS technicians' reports. Abbreviations for the common names of the host tree species, along with the scientific names, are shown in Appendices A and B. To facilitate the location of hosts, deciduous and coniferous species have been separated and listed alphabetically under the common names.

Appendix C is a series of maps for northeastern Ontario grouped alphabetically by insect species or disease pathogen and showing the location of infestations within a region or infestation boundaries that extend beyond regions.

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We also wish to acknowledge the following authors of FIDS district and regional reports from which the review was abstracted:

1950	J.M. Bussineau, K.C. Hall, F.A. Bricault, J.E. MacDonald
1951	J.M. Bussineau, K.C. Hall, W.A. Sillers, J.E. MacDonald
1952	E.O. Clinton, C. Vaillancourt, W.R. Sillers
1953	E.O. Clinton, C. Vaillancourt, H.G. McPhee
1954	E.O. Clinton, C. Vaillancourt, R.L. Bowser
1955-1956	E.O. Clinton, C.A. Barnes, R.L. Bowser
1957-1958	J.R. McPhee, R.L. Bowser, C.A. Barnes
1959	J.R. McPhee, J.R. Trinnell, D.G. Grisdale
1960-1961	J.R. McPhee, F. Livesey, J.R. Trinnell
1962-1964	J.R. McPhee, F. Livesey, R.A. Trieselmann
1965	J.R. McPhee, D. Ropke, R.A. Trieselmann
1966	J.R. McPhee, D. Ropke, W. Ingram
1967	G.W. Cameron, D. Ropke, W. Ingram
1968-1969	E.L. Houser, W. Ingram
1970-1973	E.L. Houser, F. Livesey
1974-1977	W.D. Biggs, K.C. Hall
1978-1980	H. Brodersen, K.C. Hall

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INTRODUCTION

This report is a review of significant insects and diseases that had a noticeable impact on forests and ornamental trees from 1950 to 1980 in the area covered by the present Espanola District. The Espanola District came into existence in 1973 and is composed of the western portion of the Sudbury District including Manitoulin Island. The primary hosts affected by the insects and diseases listed in the report are the major tree species, natural and planted. The insects and diseases included are capable of causing tree mortality or reduced growth. Abiotic problems such as drought, winter drying, frost, salt, wind and rodents are also included in this report.

SUMMARY

FOREST INSECTS

Birch Skeletonizer, *Bucculatrix canadensisella* Cham. [Major]
pages 9 - 14

Severe defoliation by this leaf skeletonizer seldom causes tree mortality but continuous heavy infestations can weaken the tree, making it susceptible to secondary insects and diseases. Large outbreaks usually last three to four years, then suddenly collapse. Severe outbreaks have occurred from 1949 to 1950, from 1959 to 1963 and from 1971 to 1973.

Large Aspen Tortrix, *Choristoneura conflictana* (Wlk.) [Major]
pages 15 - 24

No tree mortality has been attributed to this insect, which feeds from within a rolled leaf. The primary host is aspen. The insect was not reported in the district prior to 1957. Infestations occurred from 1957 to 1961 and from 1969 to 1977.

Spruce Budworm, *Choristoneura fumiferana* (Clem.) [Major]
pages 25 - 47

This insect is probably the most publicized and destructive forest pest in eastern Canada. Its preferred hosts are balsam fir and white spruce, but in severe infestations, the larvae will feed on other spruce, hemlock, larch and white pine. Four or more years of heavy defoliation of balsam fir can cause tree mortality. Larvae were present in the district at low levels until 1969. Moderate-to-severe infestations were recorded up to 1980. Tree mortality was first observed in 1973.

Jack Pine Budworm, *Choristoneura pinus pinus* Free. [Major]
pages 48 - 50

Severe continuous defoliation by larvae of this insect can cause top killing and tree mortality. Areas of moderate-to-severe infestation were recorded mainly on Scots pine from 1966 to 1970. Although jack pine is preferred, the insect will attack white pine, red pine and Scots pine.

Greenstriped Mapleworm, *Dryocampa rubicunda rubicunda* (Fabr.) [Major]
pages 51 - 55

This large defoliator prefers to feed on red maple and sugar maple. Although no mortality was reported, growth loss can occur in areas of high populations. Cockburn Island hosted high populations from 1971 to 1975.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn. [Major]
pages 56 - 71

The district experienced moderate-to-severe infestations from 1948 to 1953, from 1965 to 1969, and from 1974 to 1980.

The preferred host is trembling aspen, but larvae will feed on other deciduous species. Mortality seldom occurs as a direct result of forest tent caterpillar feeding but losses in reduced increment can be great. Often weakened trees are predisposed to attack by disease or secondary insects.

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch) [Major]
pages 72 - 73

Red pine is the preferred host but jack pine, Scots pine and other pines are attacked as well. This insect has caused considerable mortality in young plantations. The heaviest infestations occurred in the southern part of the district.

European pine sawfly, *Neodiprion sertifer* (Geoff.) [Major]
pages 74 - 75

Although the insect feeds on many species of pines it prefers Scots pine, and therefore presents a serious threat to Christmas tree growers. The insect was first discovered in the district in 1965, and its activity has been confined to Manitoulin Island.

Swaine Jack Pine Sawfly, *Neodiprion swainei* Midd. [Major]
page 76

This insect is the most destructive pest on jack pine in eastern Canada, and is responsible for considerable mortality in northeastern Ontario. Only light infestations or occasional larvae were present in the district until 1968. Moderate-to-severe defoliation was detected on an island in Shakwa Lake.

Red Pine Sawfly, *Neodiprion nanulus nanulus* Schedl. [Major]
pages 77 - 81

Populations remained low throughout the district for the entire 30-year period except in 1964 when high populations were noted on some roadside trees. The insect will attack jack pine and red pine. The old foliage is consumed by the sawfly larvae. Damage is seldom serious enough to warrant large-scale control operations.

Jack Pine Sawfly, *Neodiprion pratti banksianae* Roh. [Major]
pages 77 - 81

This sawfly can cause mortality of young trees if populations are high enough. Great La Cloche Island and townships in the northern part of the district maintained high populations for several years.

Redheaded Jack Pine Sawfly, *Neodiprion virginianus* complex [Major]
pages 77 - 81

Small pockets of moderate-to-severe defoliation were observed in the district in 1954, from 1958 to 1959, from 1964 to 1967 and from 1974 to 1975. This sawfly seldom causes sufficient damage to warrant large-scale control measures.

Aspen Leafblotch Miner, *Phyllonorycter ontario* (Free.) [Major]
pages 82 - 83

Fluctuating intensities of infestations were observed over the 30-year period. High populations seldom cause tree mortality but they can cause a reduction in tree growth. From 1952 to 1953 severe leafmining occurred throughout the entire district.

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.) [Major]
pages 84 - 85

Young, open-grown, black spruce or white spruce trees are the preferred hosts of this sawfly. They can cause severe defoliation, even mortality, after only a few years of successive heavy feeding in plantations or shelterbelts or on ornamentals. Many areas of moderate-to-severe defoliation were recorded over the 30-year period.

White Pine Weevil, *Pissodes strobi* (Peck) [Major]
pages 86 - 87

The white pine weevil attacks and kills the leader, affecting a tree's commercial and aesthetic value. White pine is the common host, but all pines and spruces may be attacked. High populations have continued to infest plantations for a number of years.

Larch Sawfly, *Pristiphora erichsonii* (Htg.) [Major]
pages 88 - 97

Four to five years of severe defoliation can cause a marked loss of radial increment. Six to nine years of moderate-to-severe defoliation can cause mortality. High populations were detected at various spots in the district from 1956 until 1977.

Other Noteworthy Insects [Major and Minor]
pages 98 - 129

Insects with the potential to cause damage to stands, regeneration and plantations.

FOREST DISEASES

Armillaria Root Rot, *Armillaria mellea* (Vahl ex Fr.) Kumm. [Major]
page 133

Weakened trees are most susceptible to attack by this disease. The disease is present in most planted areas because plantations are generally growing under unnatural conditions. The root rot has been reported primarily at low levels in the district.

Dutch Elm Disease, *Ceratocystis ulmi* (Buism.) C. Moreau [Major]
pages 133 - 134

The principal carriers of the disease are the native elm bark beetle, *Hylurgopinus rufipes* (Eich.), and the smaller European elm bark beetle, *Scolytus multistriatus* (Marsh.). The disease is spread by these beetles which breed in dead or dying elm trees. They emerge from a contaminated tree, move to a healthy tree to feed, and infect the healthy tree. The disease was first discovered in the district in 1965.

Needle Rusts of Spruce, *Chrysomyxa ledi* (Alb. & Schw.) d By., [Major]
C. ledicola Lagh.
pages 134 - 135

An epidemic can be responsible for premature defoliation and growth loss. Severe damage may kill young trees. The alternate hosts for these rusts are Labrador-tea and leather-leaf. The disease was first recorded in the district in 1958.

Ink Spot, *Ciborinia whetzelii* (Seaver) Seaver [Major]
pages 135 - 136

Severe infections will cause a loss in increment but there is no record of tree mortality caused by this disease. Varying degrees of defoliation have been recorded in the district since 1958.

White Pine Blister Rust, *Cronartium ribicola* J.C. Fisch. [Major]
pages 136 - 137

The rust is extremely destructive of white pine. Once a tree is infected it is only a matter of time before the stem is girdled and the tree dies. The alternate hosts for the rust are currants and gooseberries. Varying degrees of damage have been noted in the district since 1960.

Scleroderris Canker, *Gremmeniella abietina* (Lagerb.) Morelet [Major]
pages 137 - 138

The canker is a very serious problem on planted and natural regeneration trees. It is capable of causing considerable mortality. The disease was first detected in the district in 1966, but was not reported from 1974 to 1980.

Hypoxylon Canker, *Hypoxylon mammatum* (Wahl.) J.H. Miller [Major]
pages 138 - 139

The pathogen is a serious problem in most aspen stands. Breakage and mortality of that part of the tree above the canker are common. The disease was first recorded in the district in 1954.

Shoot Blight, *Venturia macularis* (Fr.) Müller & Arx [Major]
pages 139 - 140

Aspen regeneration is very susceptible to this disease. Damaged terminals form a shepherd's crook and repeated infections result in a club tob. Varying degrees of infection have occurred throughout the district since 1962.

Rusts of Pines, Comandra Blister Rust, *Cronartium comandrae* Pk., [Major]
Sweetfern Blister Rust, *C. comptoniae* Arth.,
Eastern Gall Rust, *C. quercuum* (Berk.) Miy. ex Shirai,
and Globose Gall Rust, *Endocronartium harknessii*
(J.P. Moore) Y. Hirat.
pages 140 - 142

The above rusts can cause tree or branch mortality or deformity. They may also make a tree more susceptible to insects, decay and wind breakage. The rusts have been monitored in the district since 1959.

Other Noteworthy Diseases [Major and Minor]
pages 143 - 146

These insects and diseases are capable of causing serious damage.

ABIOTIC DAMAGE

pages 149 - 152

This condition refers to damage caused by a non-living agent such as drought, frost, salt and winter drying. Abiotic factors have a great influence on all types of trees.

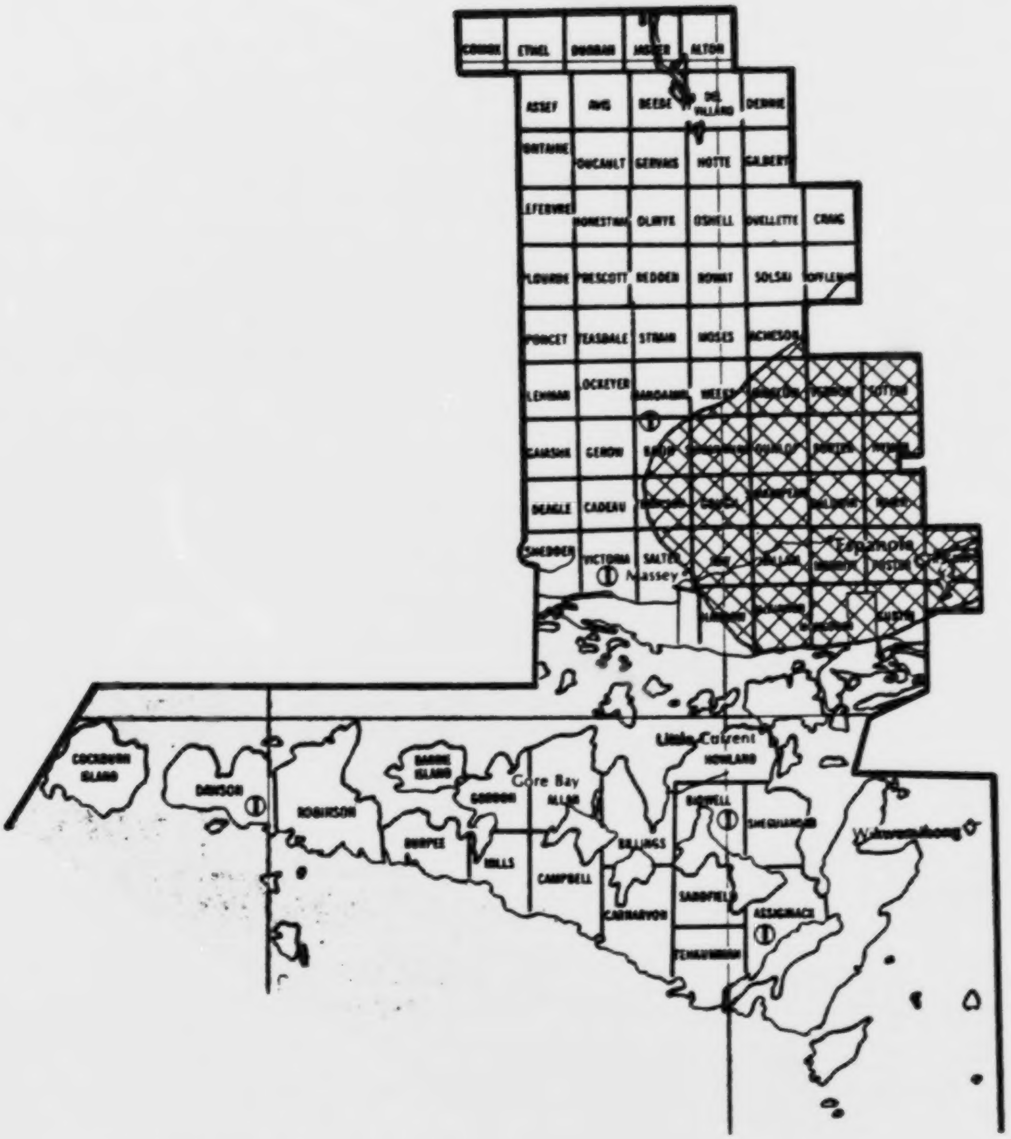
INSECTS

Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

Host(s): birch [Major]

Year	Remarks
1950	Early leaf discoloration made aerial mapping difficult. Ground checks revealed that the infestation boundaries were similar to those mapped in 1949 (see map, page 10).
1951-1958	not reported
1959	Pockets of moderate-to-severe defoliation were observed on Manitoulin Island.
1960	Severe defoliation was recorded on trees throughout Manitoulin Island.
1961	The moderate-to-severe infestation on Manitoulin Island spread northwards to encompass the southern part of the district (see map, page 11).
1962	Some northward expansion occurred in the area of infestation.
1963	Populations declined to light-to-moderate intensity throughout the area of previous infestation.
1964	The infestation declined to scattered pockets of light defoliation.
1965	The infestation collapsed.
1966-1970	not reported
1971	A narrow band of moderate-to-severe defoliation was recorded along the shore of Lake Huron, extending east from the district boundary to Espanola (see map, page 12).
1972	Increased populations caused moderate-to-severe defoliation in the southern two-thirds of the district (see map, page 13).
1973	The infestation causing moderate-to-severe defoliation persisted in the southern part of the district. Except for a few scattered pockets of light defoliation, the previous infestation on Manitoulin Island collapsed (see map, page 14).
1974	The infestation collapsed.
1975-1980	not reported

ESPANOLA DISTRICT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DEBBIE
GILBERT
LEFEBVRE
HOMESTEAD
OUELLETTE
BEAGLE
ETHEL
ALTON

Birch Skeletonizer

Areas within which defoliation occurred in 1950

Scale

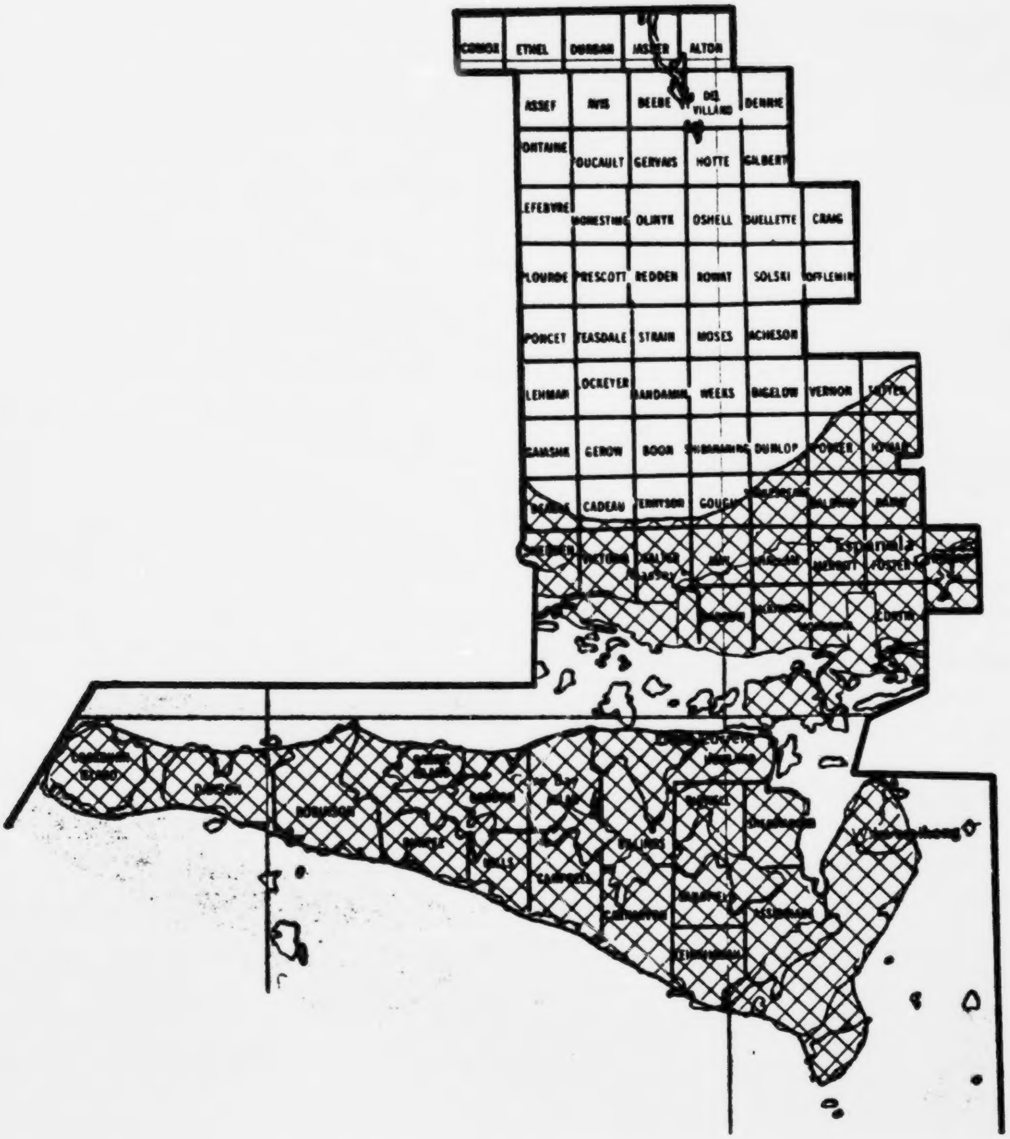
Kilometres 20 10 0 20

LEGEND

Light defoliation ①

Moderate-to-severe defoliation ▨

ESPANOLA DISTRICT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GEROW
BOON
DUNLOP
CADEAU
TENNYSON
GOUGH
Espanola
MERRITT
FOSTER

Birch Skeletonizer

Areas within which defoliation occurred in 1961

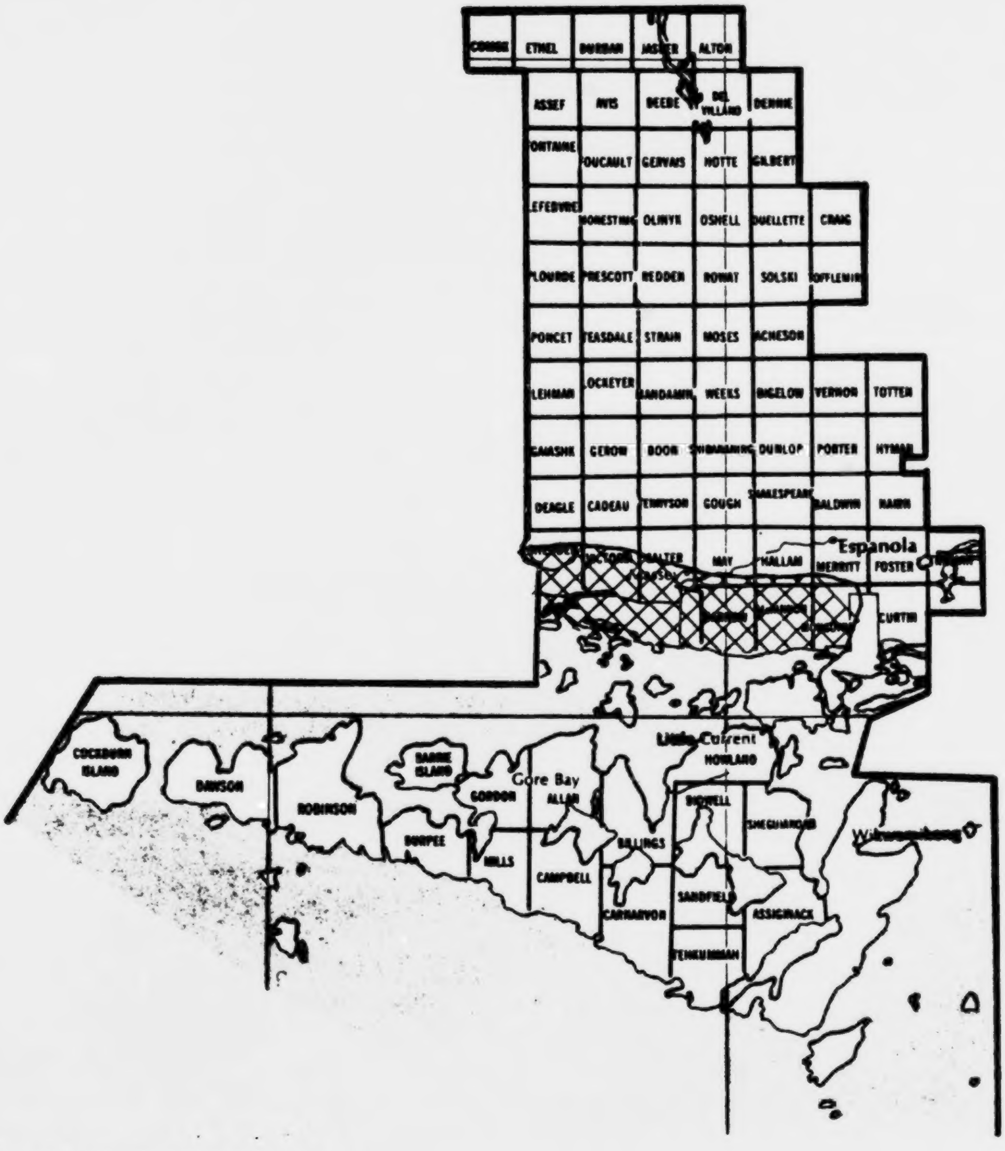
Scale

Kilometres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ▨

ESPANOLA DISTRICT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BILLINGS
CAMPBELL
CARNARVON
SANDFIELD
ASSIGINACK
TEHKUMMAH
Wikwemikong

Birch Skeletonizer

Areas within which defoliation occurred in 1971

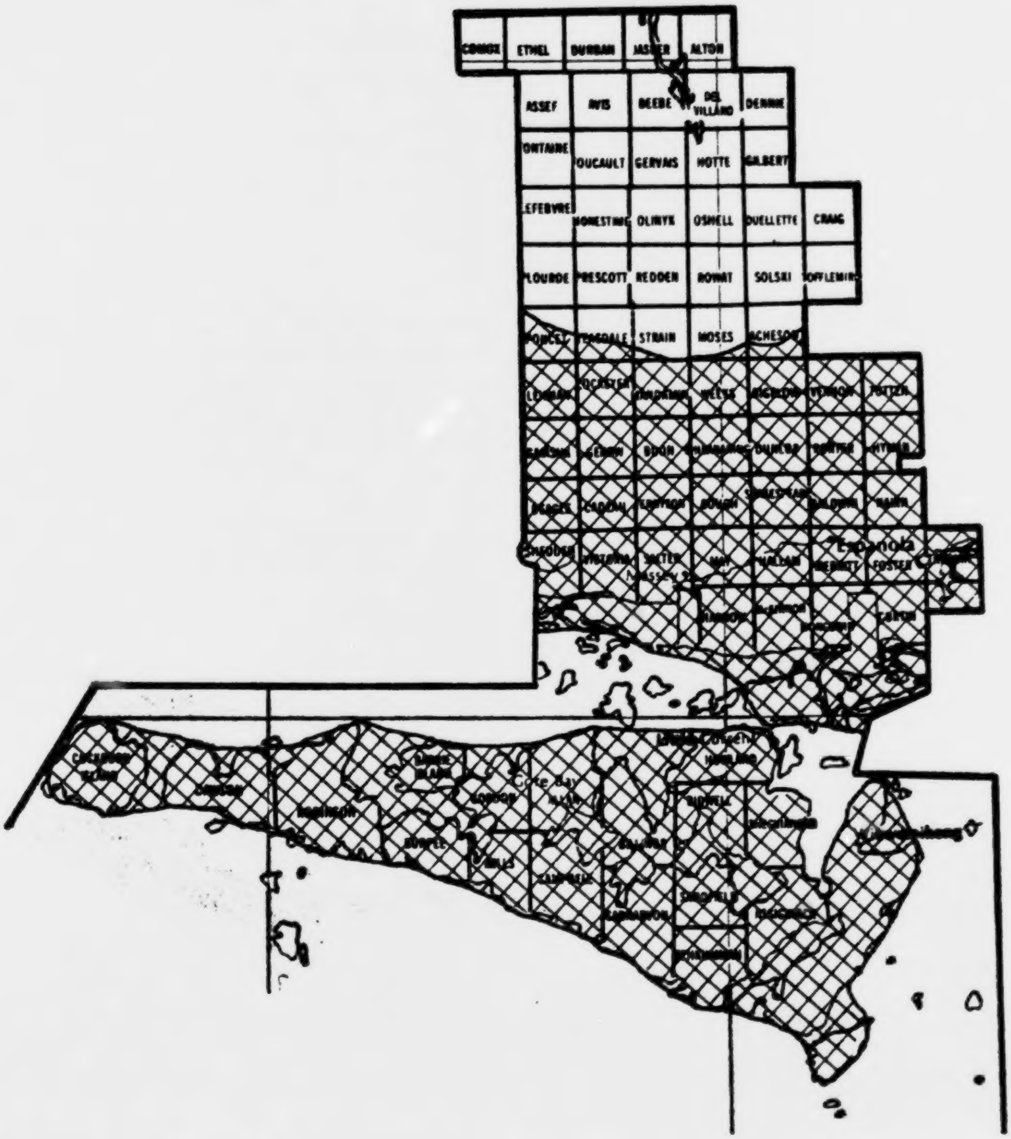
Scale

Kilometres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ▨

ESPANOLA DISTRICT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STRAIN
MOSES
ACHESON
Espanola
FOSTER
Massey
Gore Bay

Birch Skeletonizer

Areas within which defoliation occurred in 1972

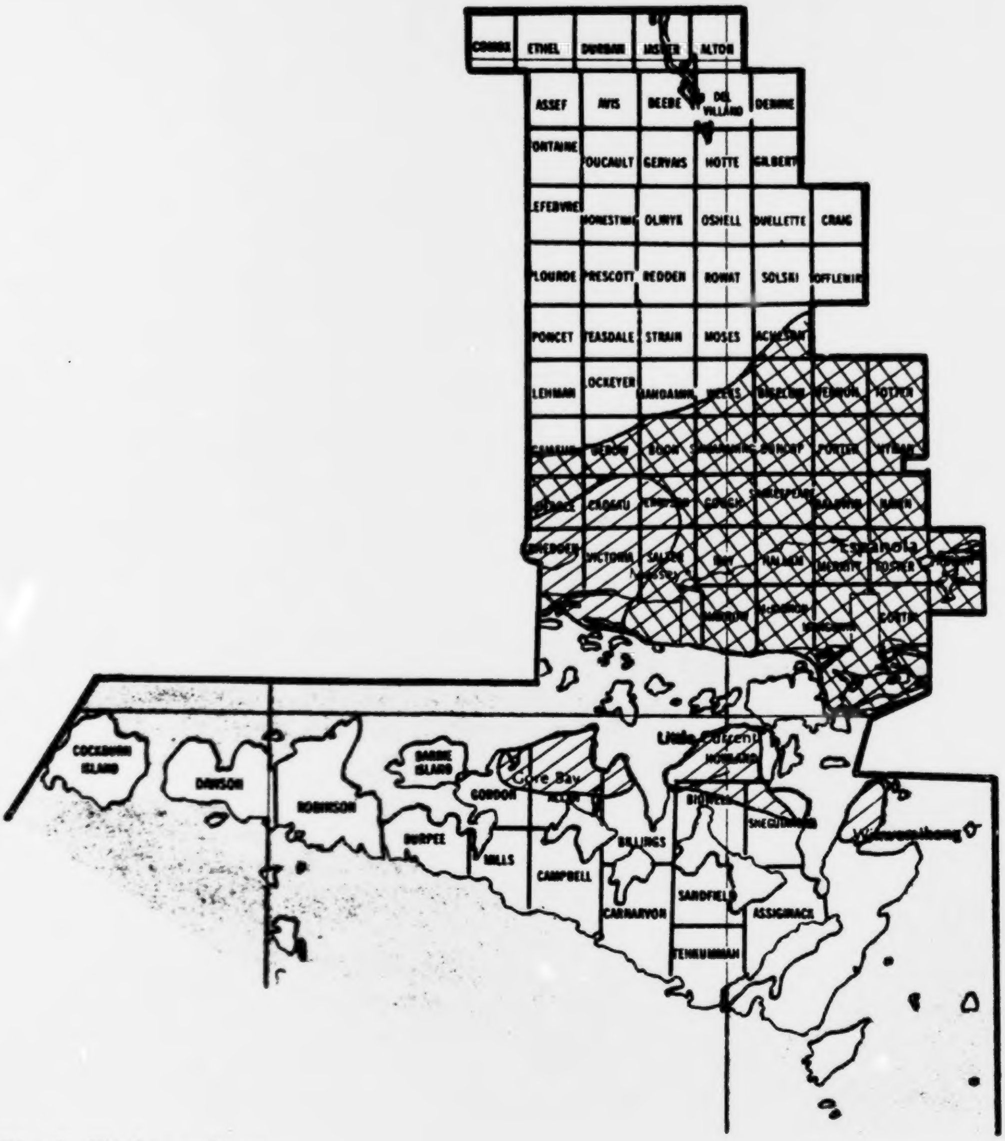
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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CAMPBELL
BILLINGS
CARNARVON
Little Current
HOWLAND
BIDWELL
SHEGUIANDAH
SANDFIELD
ASSIGINACK
TEHKUMMAH

Birch Skeletonizer

Areas within which defoliation
occurred in 1973

Scale

Kilometres 20 10 0 20

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ▩

Large Aspen Tortrix, *Choristoneura conflictana* (Wlk.)

[Major]

Host(s): tA

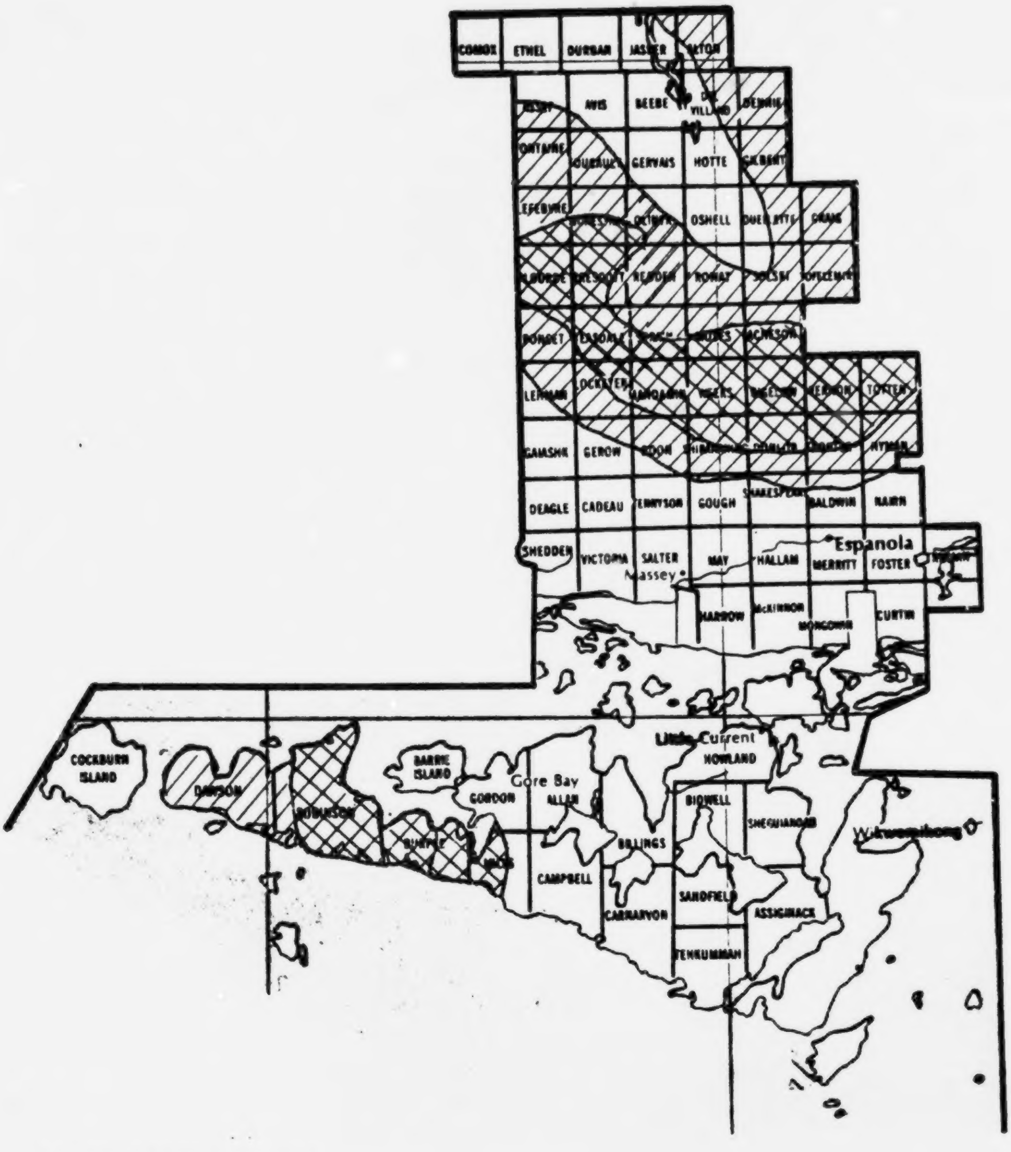
Year	Remarks
1950-1956	not reported
1957	Two separate moderate-to-severe infestations surrounded by areas of light defoliation occurred in the district. One was in the central part of the district, the other on Manitoulin Island (see map, page 17).
1958	Declining populations in the mainland portion of the district resulted in broken pockets of moderate-to-severe defoliation. On Manitoulin Island the area of moderate-to-severe damage spread to include Cockburn Island (see map, page 18).
1959	Populations declined on Manitoulin Island but increased in the central part of the district to form a continuous band of moderate-to-severe infestation (see map, page 19).
1960	The previous infestation declined to light intensity except for a few pockets of moderate-to-severe defoliation in Salter and Tennyson twps.
1961	Pockets of light infestation were detected in the southern part of the district and on Manitoulin Island.
1962	Infestations collapsed.
1963-1968	not reported
1969	A pocket of light infestation was recorded in Shedden Twp.
1970	The previous small pocket increased in size and intensity to a moderate-to-severe infestation.
1971	Population increases resulted in several new pockets of moderate-to-severe defoliation in the district (see map, page 20).
1972	Four separate infestations of moderate-to-severe damage occurred in the district (see map, page 21).
1973	Pockets of moderate-to-severe defoliation were observed throughout Manitoulin Island and in the central part of the district (see map, page 22).

(cont'd)

Large Aspen Tortrix, *Choristoneura conflictana* (Wlk.) (concl.)

Year	Remarks
1974	Populations declined to low numbers except in Nairn, Barrie Island, Campbell, Billings, Carnarvon and Tehkummah twps (see map, page 23).
1975	Populations increased on Manitoulin Island and moderate-to-severe damage was mapped in the northeast corner of the district (see map, page 24).
1976	The situation on Manitoulin Island remained relatively unchanged and areas of moderate-to-severe damage occurred in Merritt and Nairn twps.
1977	Populations declined to endemic levels in the district except for a light infestation on Barrie Island.
1978	Populations collapsed.
1979	not reported
1980	A small pocket of moderate-to-severe defoliation was detected in Gordon Twp.

ESPANOLA DISTRICT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DAWSON
ROBINSON
BARRIE ISLAND
GORDON
Gore Bay
ALLAN
Little Current
HOWLAND
BIDWELL
SHEGUIANDAH
BILLINGS
CAMPBELL
CARNARVON
SANDFIELD
ASSIGINACK
TEHKUMMAH
Wikwemikong

Large Aspen Tortrix

Areas within which defoliation occurred in 1957

Scale

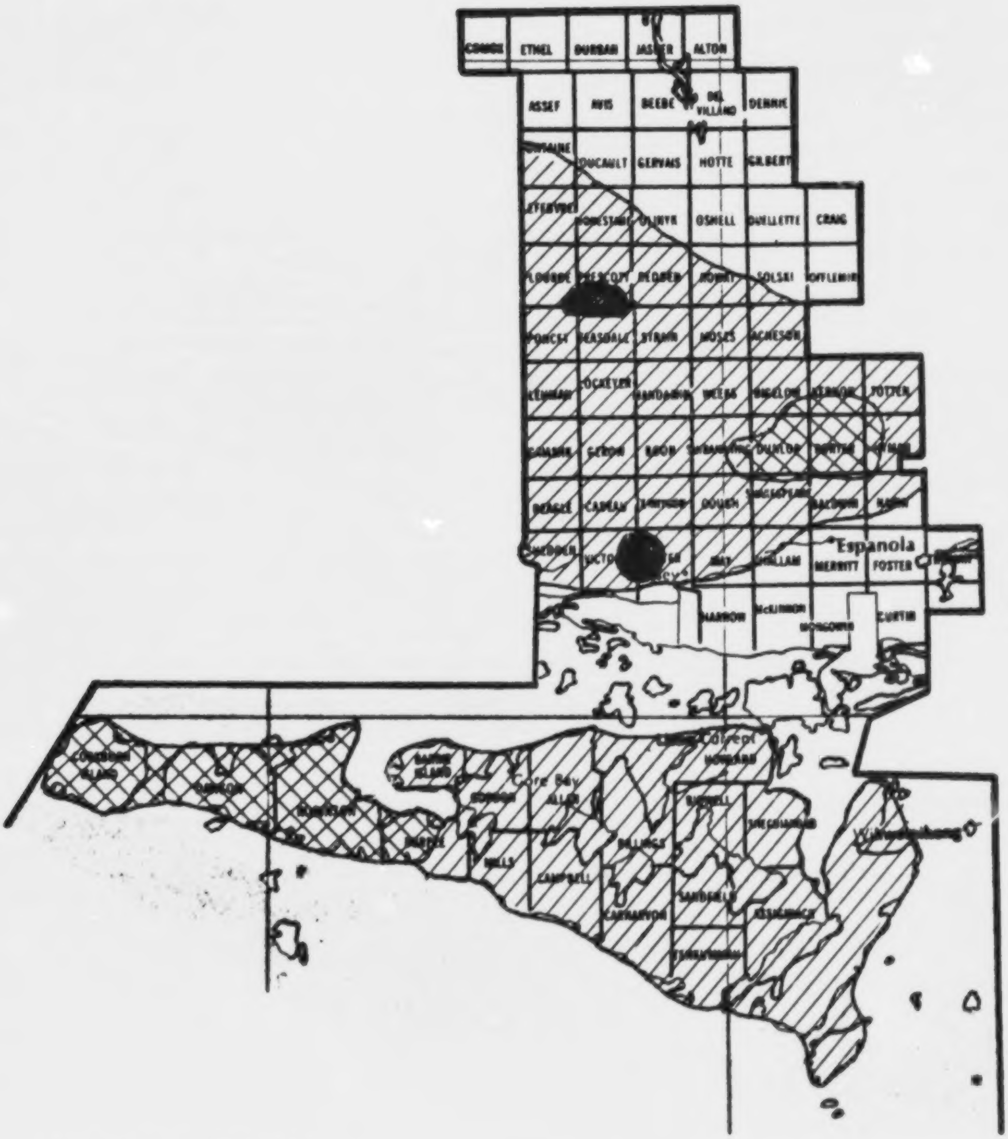
Kilometres 20 10 0 20

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ▩

ESPANOLA DISTRICT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BILLINGS
CAMPBELL
CARNARVON
SANDFIELD
ASSIGINACK
HOWLAND
SHEGUIANDAH
MILLS
BURPEE
GORDON

Large Aspen Tortrix

Areas within which defoliation occurred in 1958

Scale

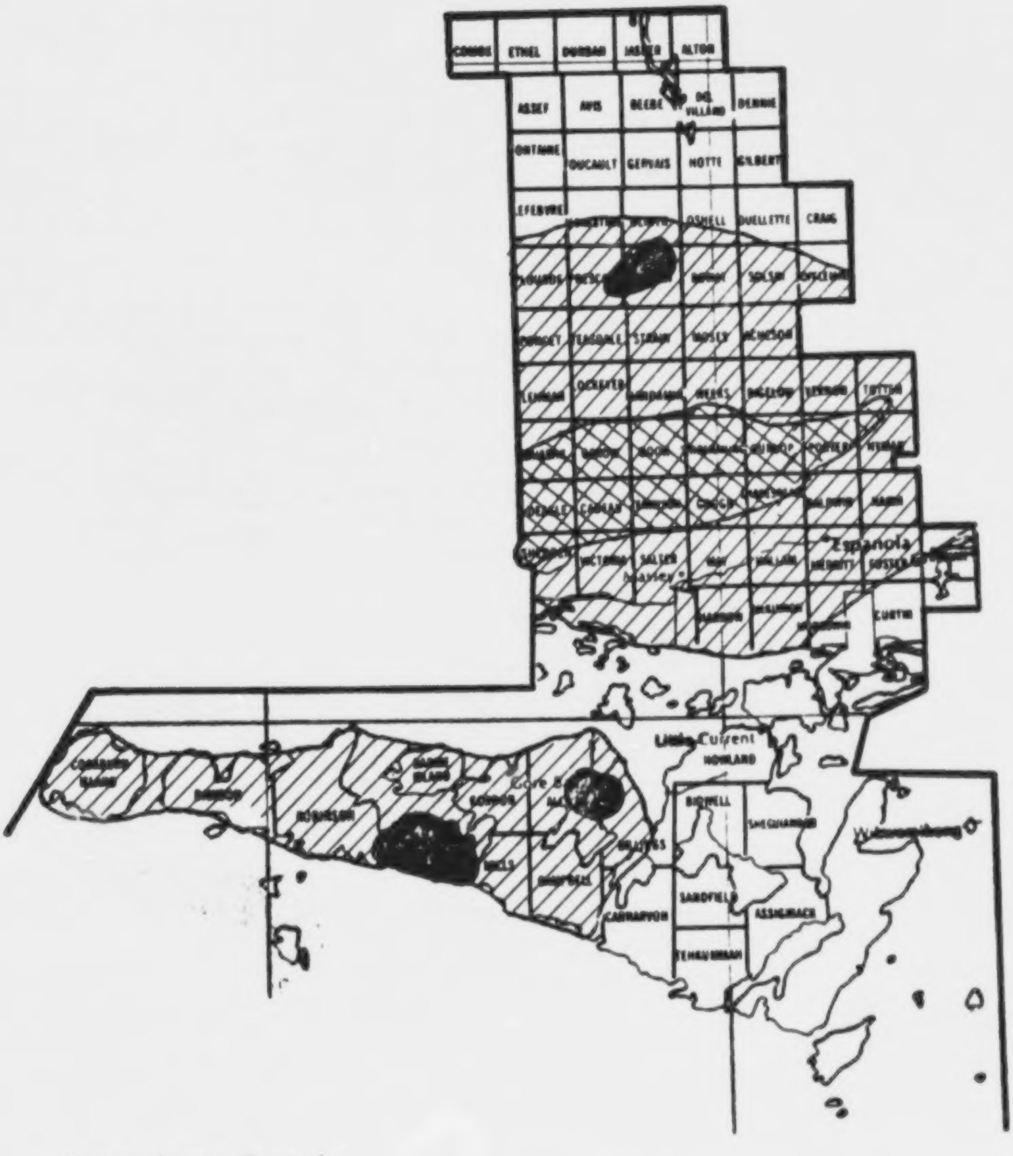
Kilometres 20 10 0 20

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ● or ▦

ESPANOLA DISTRICT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CARNARVON
TEHKUMMAH
BILLINGS
ROBINSON
COCKBURN ISLAND

Large Aspen Tortrix

Areas within which defoliation occurred in 1959

LEGEND

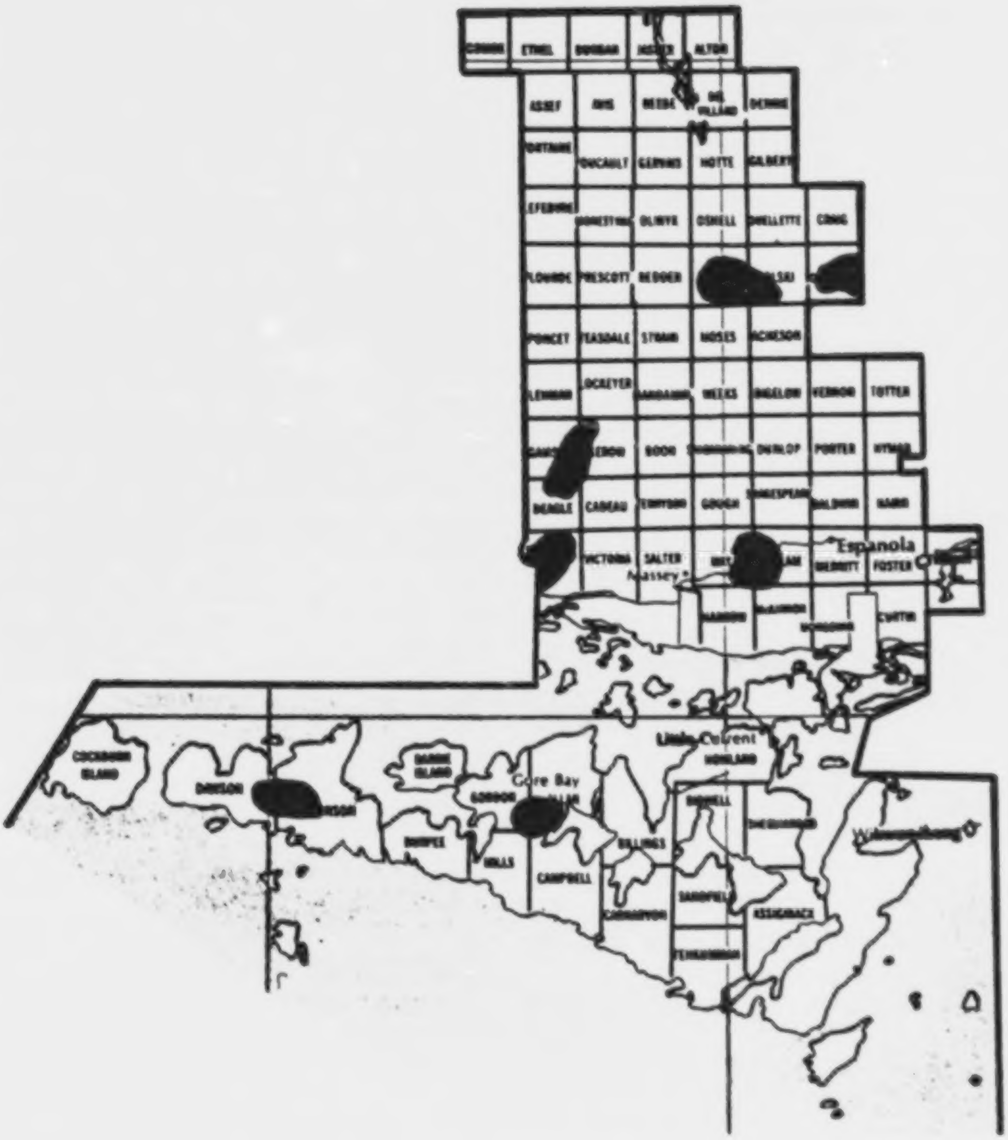
Light defoliation ▨

Moderate-to-severe defoliation ● or ▩

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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Massey
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Gore Bay
Scale
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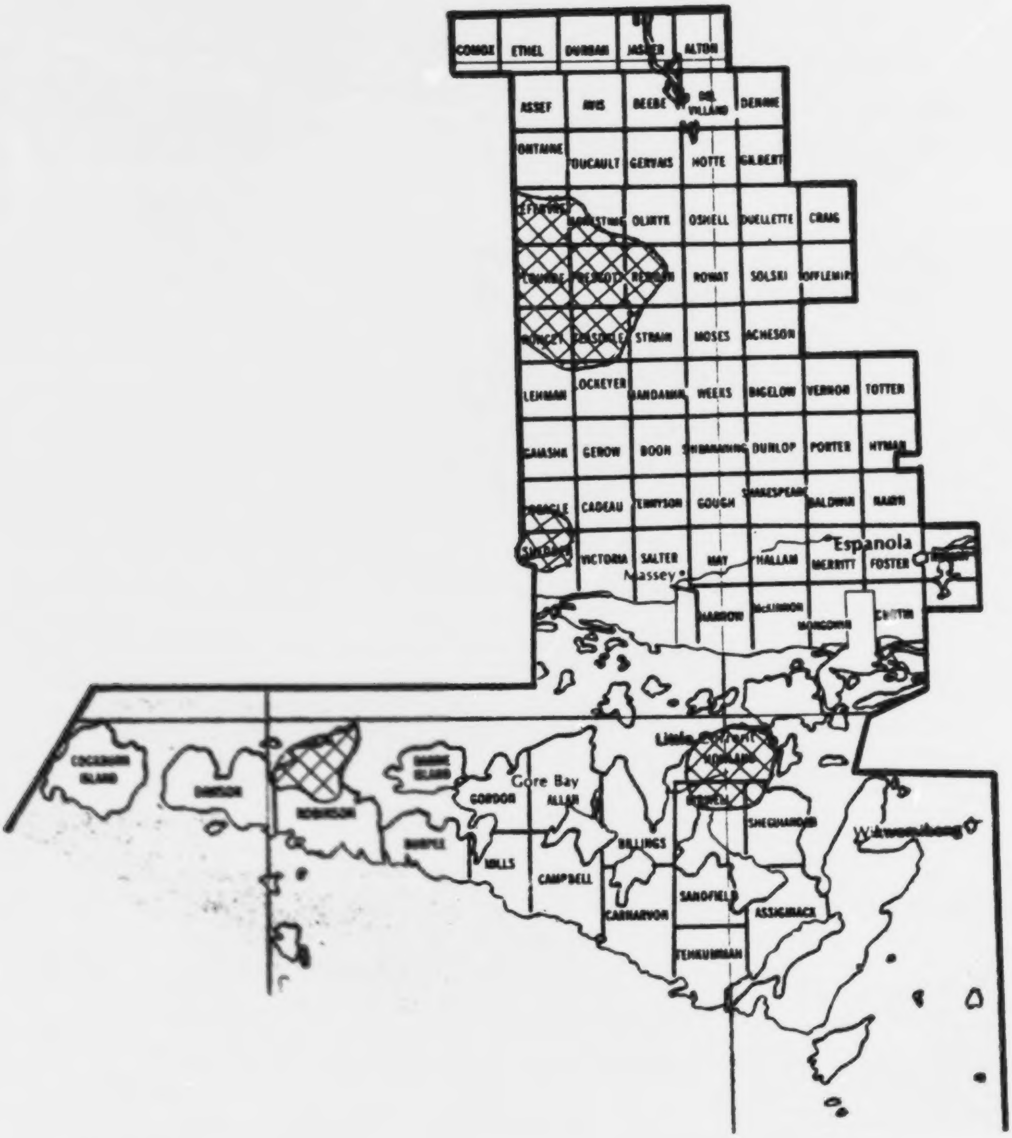
Large Aspen Tortrix

Areas within which defoliation occurred in 1971

LEGEND

Moderate-to-severe defoliation ●

ESPANOLA DISTRICT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DAWSON
ROBINSON
GORDON
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BURPEE
MILLS
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BILLINGS
Little Current
HOWLAND
BIDWELL
SHEGUIANDAH
Wikwemikong
SANDFIELD
CARNARVON
ASSIGINACK
TEHKUMMAH

Large Aspen Tortrix

Areas within which defoliation occurred in 1972

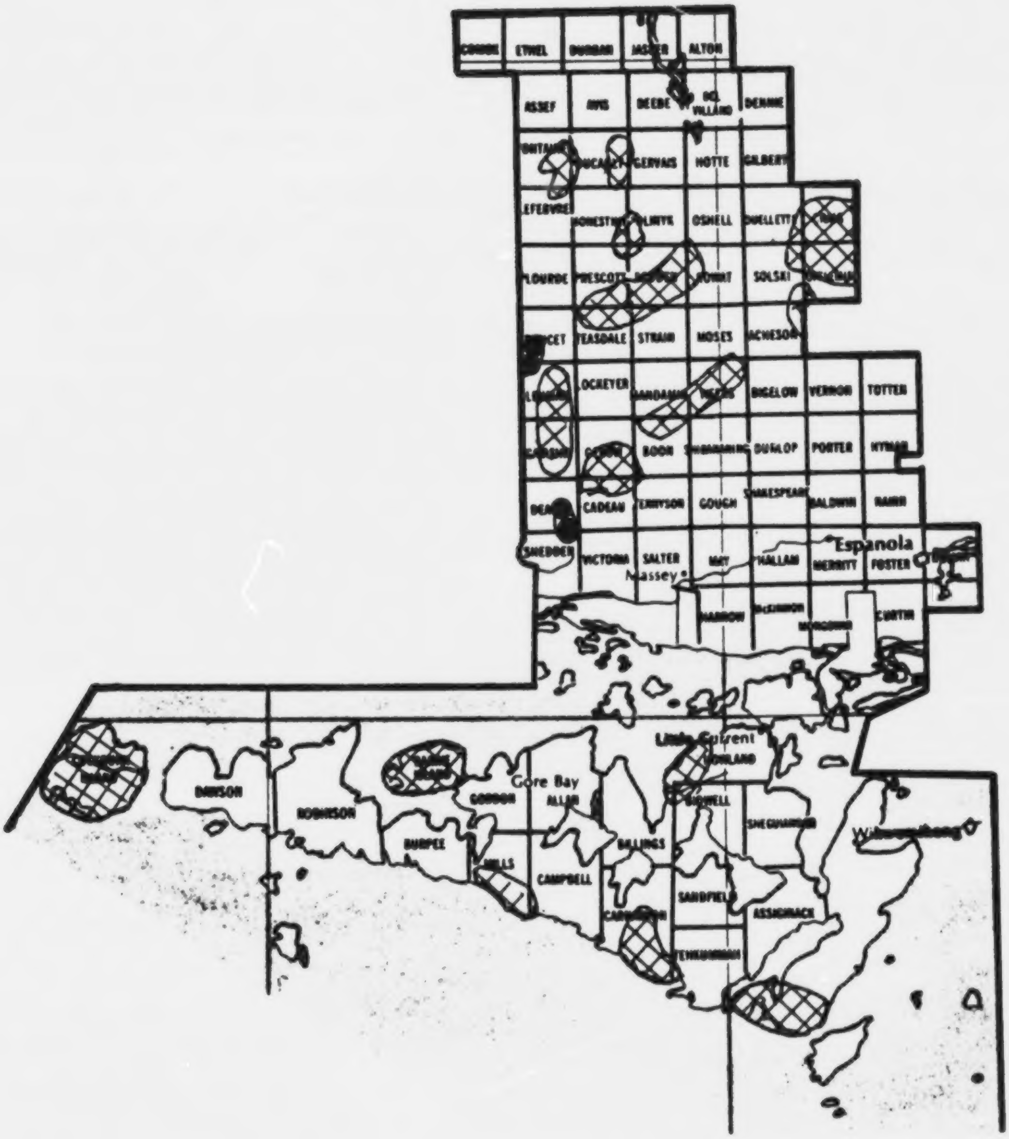
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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SANDFIELD
ASSIGINACK
TEHKUMMAH

Large Aspen Tortrix

Areas within which defoliation occurred in 1973

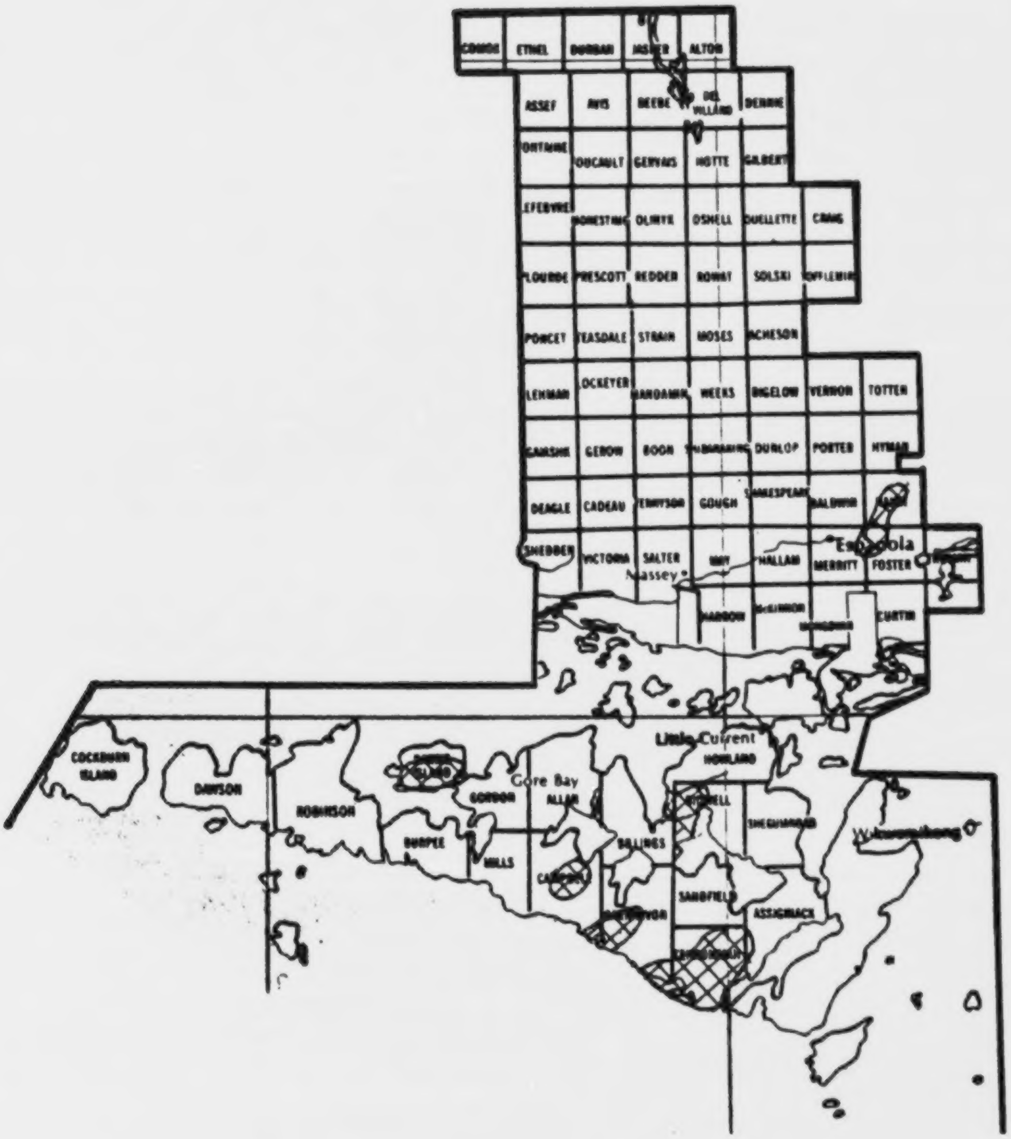
Scale

Kilometres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ● or ▨

ESPANOLA DISTRICT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DEL VILLANO
DENNIE
CONNOR
ETHEL
DUNBAR
JASPER
ALTON

Large Aspen Tortrix

Areas within which defoliation occurred in 1974

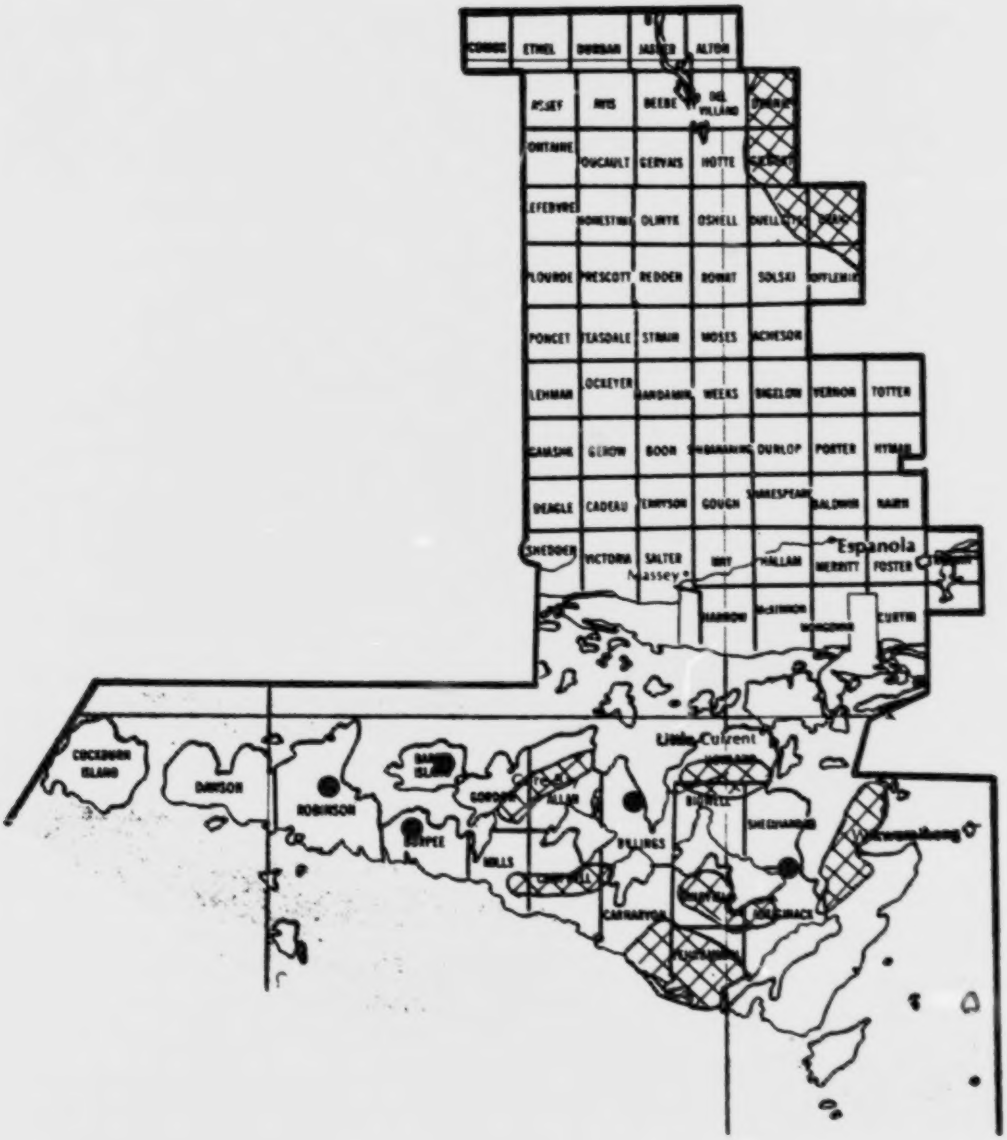
Scale

Kilometres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ▨

ESPANOLA DISTRICT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CURTIN
Little Current
COCKBURN ISLAND
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ROBINSON
BURPEE
MILLS
GORDON
ALLAN
BIDWELL
HOWLAND
BILLINGS
SHEGUIANDAH
CARNARVON

Large Aspen Tortrix

Areas within which defoliation occurred in 1975

Scale

Kilometres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ● or ▨

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

Host(s): spruce, bF [Major]

Year	Remarks
1950	Populations remained at endemic levels. One collection was made in Ouellette Twp.
1951-1954	not reported
1955	Occasional trace defoliation was observed in Robinson Twp.
1956	Low numbers were collected in Merritt, Foster, Gordon and Assiginack twps.
1957-1960	Occasional larvae were recorded at numerous locations throughout the district.
1961	Populations increased on Manitoulin Island. A light infestation was reported in Allan Twp and areas of light defoliation were found at other locations on the island.
1962	Populations and locations of damage were the same as in the previous year.
1963	Numerous larvae were collected on the east end of Manitoulin Island.
1964-1965	Occasional larvae were recorded at numerous locations throughout the district.
1966	A light infestation was observed in Allan Twp.
1967	Low numbers were commonly found in the district.
1968	Population increases were detected throughout the district (see map, page 28).
1969	Except for a moderate-to-severe infestation in Oshell and Craig twps, only occasional light infestation were detected in the district (see map, page 29).
1970	The large moderate-to-severe infestation in Sudbury District spread to the northeast corner of the Espanola District affecting Dennie, Del Villano, Oshell, Ouellette, Hotte, Craig and Olinyk twps (see map, page 30).

(cont'd)

Spruce Budworm, *Choristoneura fumiferana* (Clem.) (cont'd)

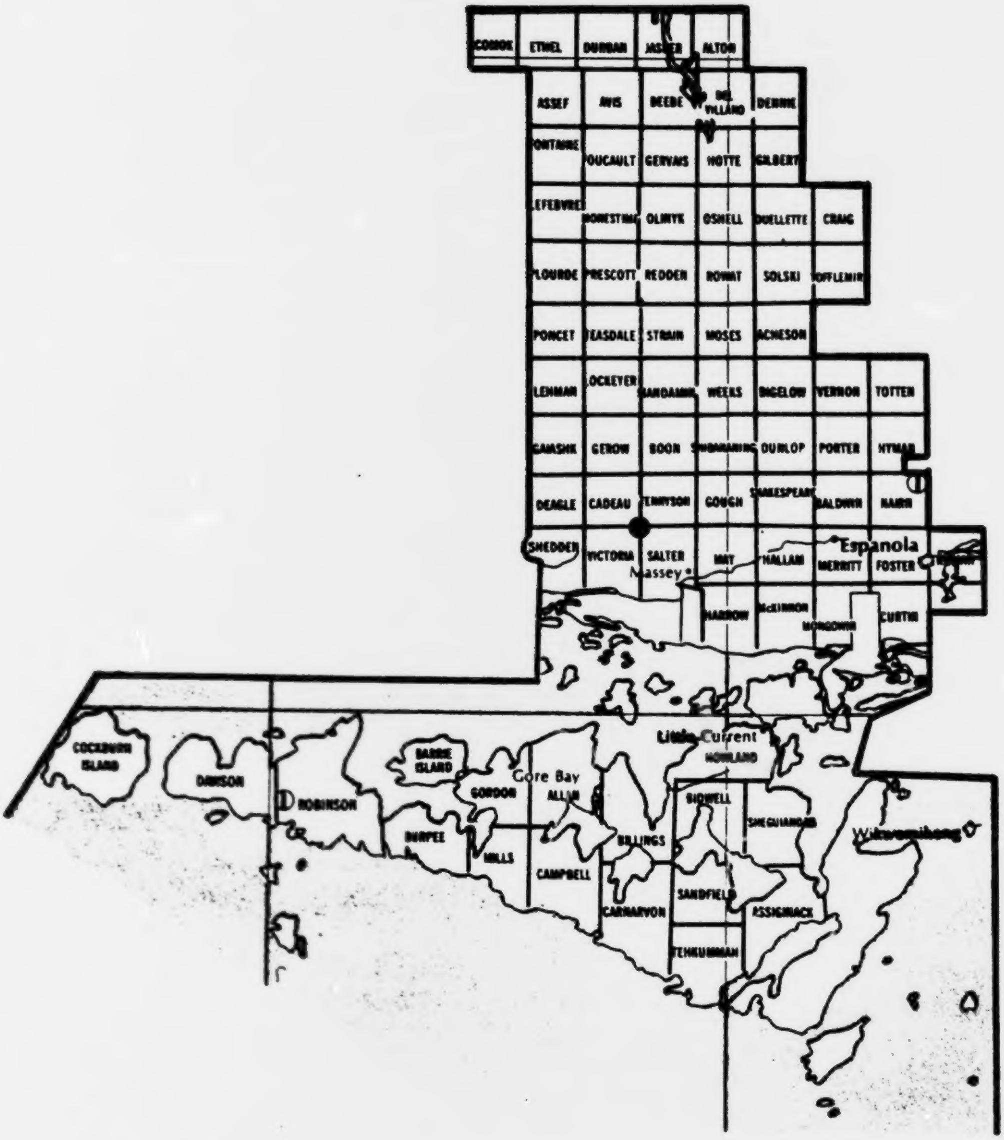
Year	Remarks
1971	New small pockets of moderate-to-severe damage were reported throughout the district. A new and separate moderate-to-severe infestation appeared, centred in Plourde Twp. The previous infestation in the northeastern part of the district increased in size (see map, page 31).
1972	Two separate areas of moderate-to-severe defoliation appeared on Manitoulin Island. The previous two infestations in the northern part of the district joined and two fingers of the single moderate-to-severe infestation spread southwards towards Lake Huron (see map, page 32).
1973	The area of moderate-to-severe defoliation increased slightly but remained similar in shape and distribution to that of 1972. The greatest change occurred on Manitoulin Island where several new pockets of moderate-to-severe defoliation appeared (see map, page 33). Light tree mortality was detected in Gilbert and Hotte twps.
1974	Infestations of moderate-to-severe damage on Manitoulin Island continued to expand on Cockburn Island. A modest southward expansion of the area of moderate-to-severe defoliation occurred in the main part of the district (see map, page 34). Light mortality was again reported in Hotte and Gilbert twps (see map, page 35).
1975	Virtually the entire district, including Manitoulin and Cockburn islands, experienced moderate-to-severe defoliation (see map, page 36). Only a narrow band along the north shore of the North Channel was free of defoliation. Tree mortality was the same as in the previous year (see map, page 37).
1976	There was little change in defoliation boundaries from 1975. The moderate-to-severe infestation decreased in intensity to moderate in the southern part of the district (see map, page 38). A significant increase occurred in the area of spruce budworm-associated tree mortality. Ten townships in the northern part of the district were affected (see map, page 39).
1977	The area of moderate-to-severe defoliation decreased in the southern part of the district, including Manitoulin and Cockburn islands (see map, page 40). A new area of mortality was detected in Plourde and Lefebvre twps (see map, page 41).

(cont'd)

Spruce Budworm, *Choristoneura fumiferana* (Clem.) (concl.)

Year	Remarks
1978	Except for a small area along the North Channel the mainland part of the district was covered by a moderate-to-severe infestation. There was little change in the budworm situation on Manitoulin Island (see map, page 42). Little change occurred in the area and distribution of mortality (see map, page 43).
1979	All of the Espanola District with the exception of the northern part of Manitoulin Island experienced moderate-to-severe defoliation (see map, page 44). In addition to the previous areas of mortality, new mortality was recorded in Robinson Twp on Manitoulin Island (see map, page 45).
1980	Little change occurred in the boundaries of the moderate-to-severe infestation (see map, page 46). A significant increase was noted in the area experiencing tree mortality (see map, page 47).

ESPANOLA DISTRICT



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ROBINSON
BARRIE ISLAND
GORDON
Gore Bay
ALLAN
BURPEE
MILLS
CAMPBELL
BILLINGS
CARNARVON
Little Current
HOWLAND
BIDWELL
SHEGUIANDAH
SANDFIELD
ASSIGINACK
TEHKUMMAH
Wikwemikong
Espanola
Massey

Spruce Budworm

Areas within which defoliation occurred in 1968

LEGEND

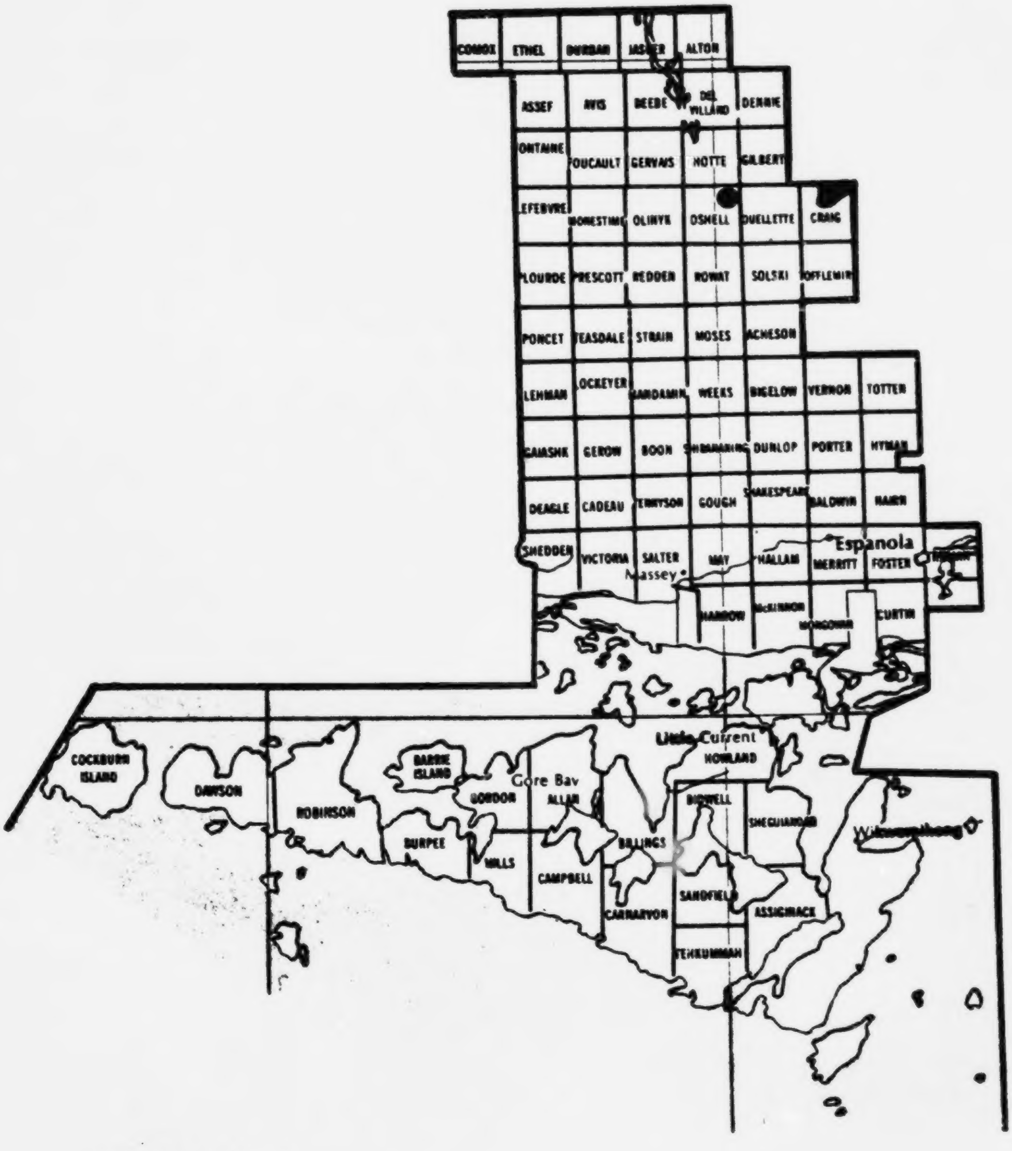
Light defoliation ◐

Moderate-to-severe defoliation ●

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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BIDWELL
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CARNARVON
SANDFIELD
ASSIGINACK
TEHKUMMAH
Wikwemikong
Scale
Kilometres 20 10 0 20

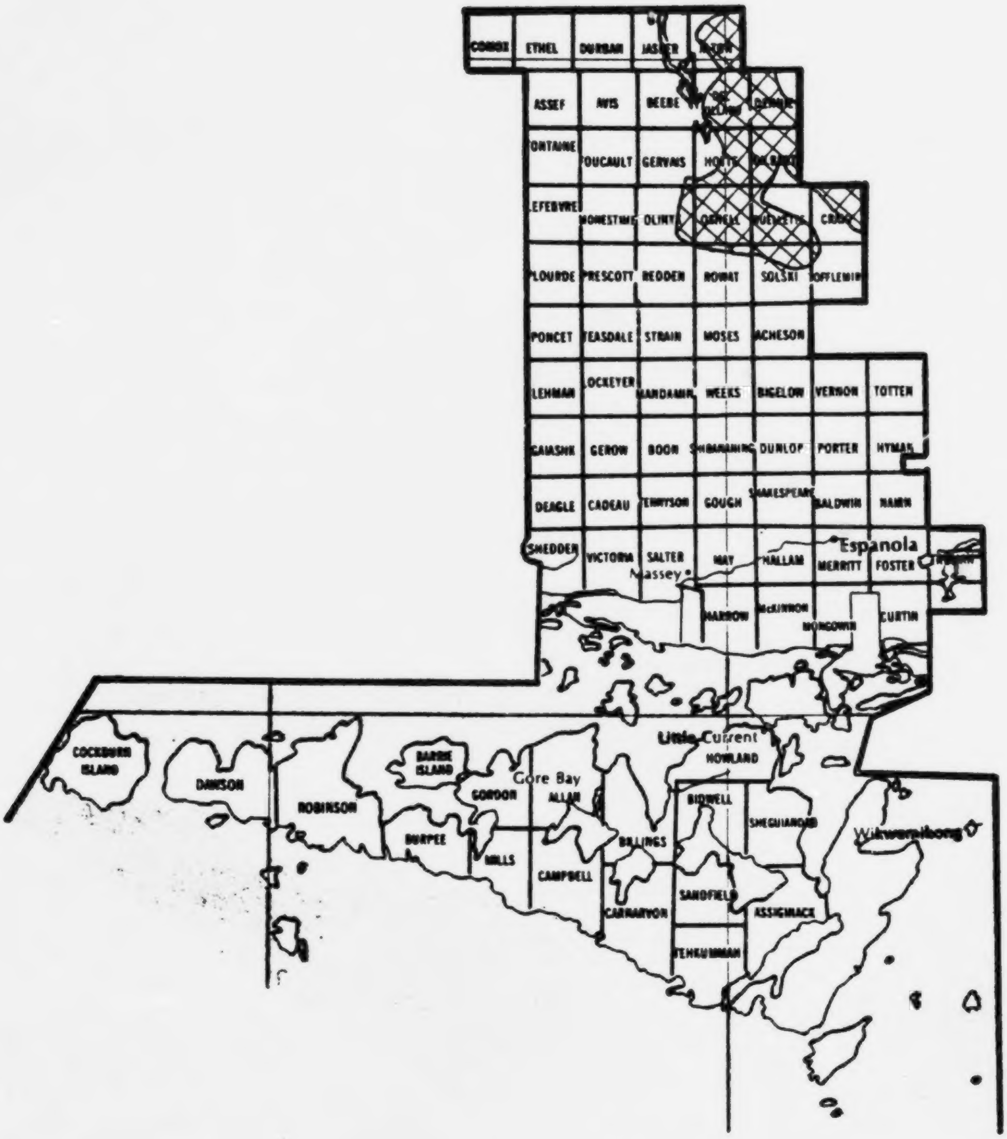
Spruce Budworm

Areas within which defoliation occurred in 1969

LEGEND

Moderate-to-severe defoliation ●

ESPANOLA DISTRICT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SANDFIELD
ASSIGINACK
TEHKUMMAH

Spruce Budworm

Areas within which defoliation occurred in 1970

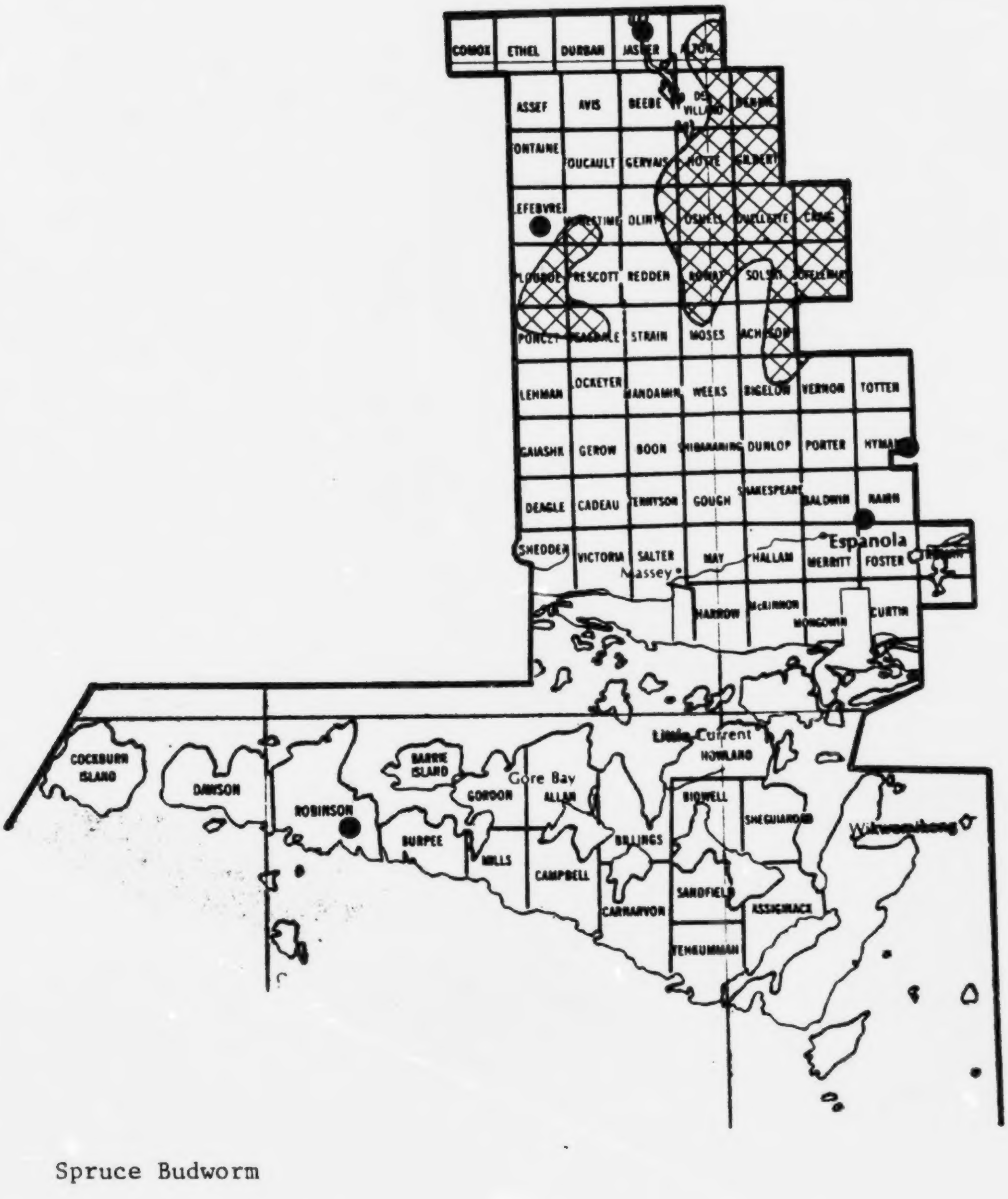
Scale

Kilometres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ● or ▨

ESPANOLA DISTRICT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BILLINGS
CARNARVON
SANDFIELD
ASSIGINACK
TEHKUMMAH

Spruce Budworm

Areas within which defoliation occurred in 1971

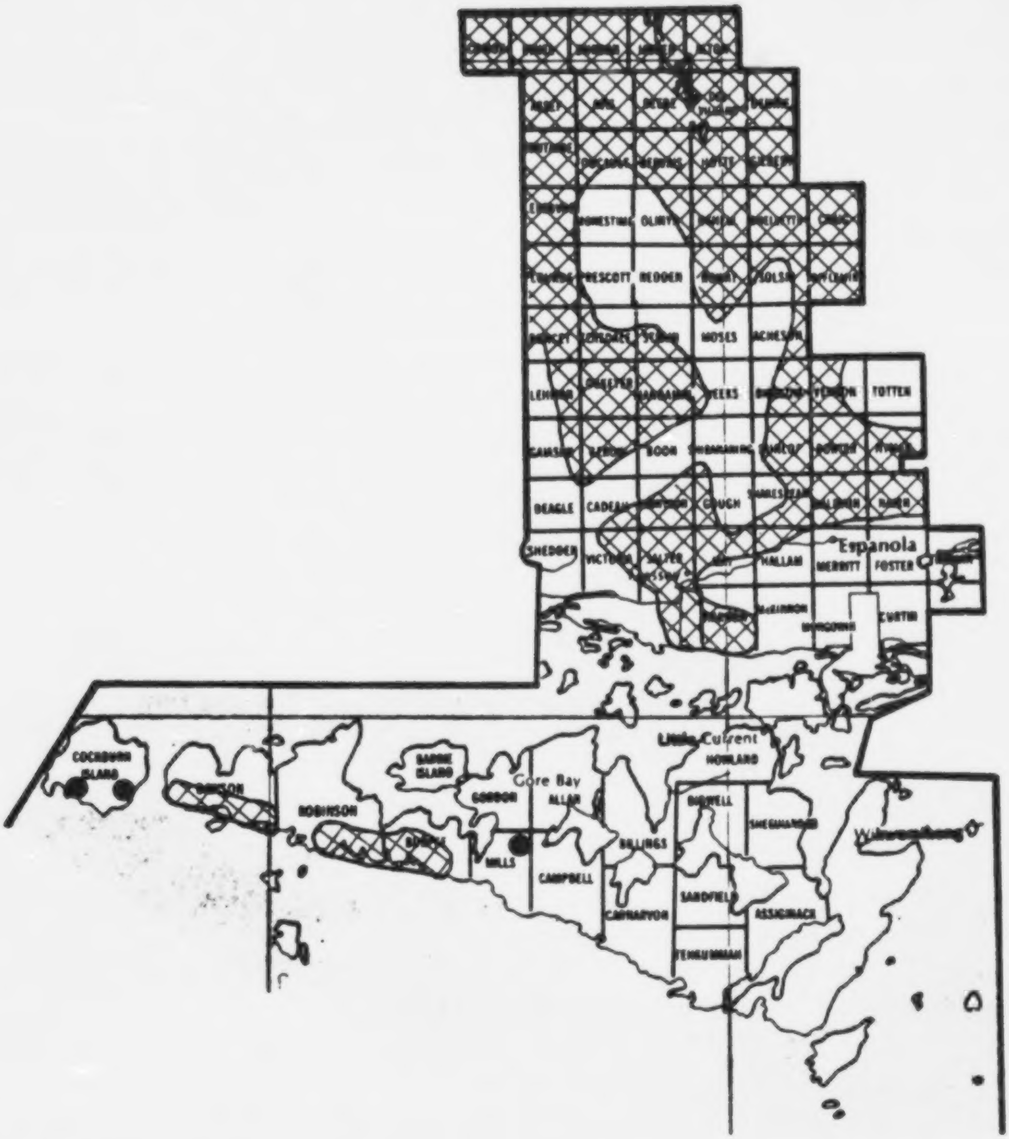
LEGEND

Moderate-to-severe defoliation ● or ▨

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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REDDEN
ACHESON
BOON
McKINNON

Spruce Budworm

Areas within which defoliation occurred in 1972

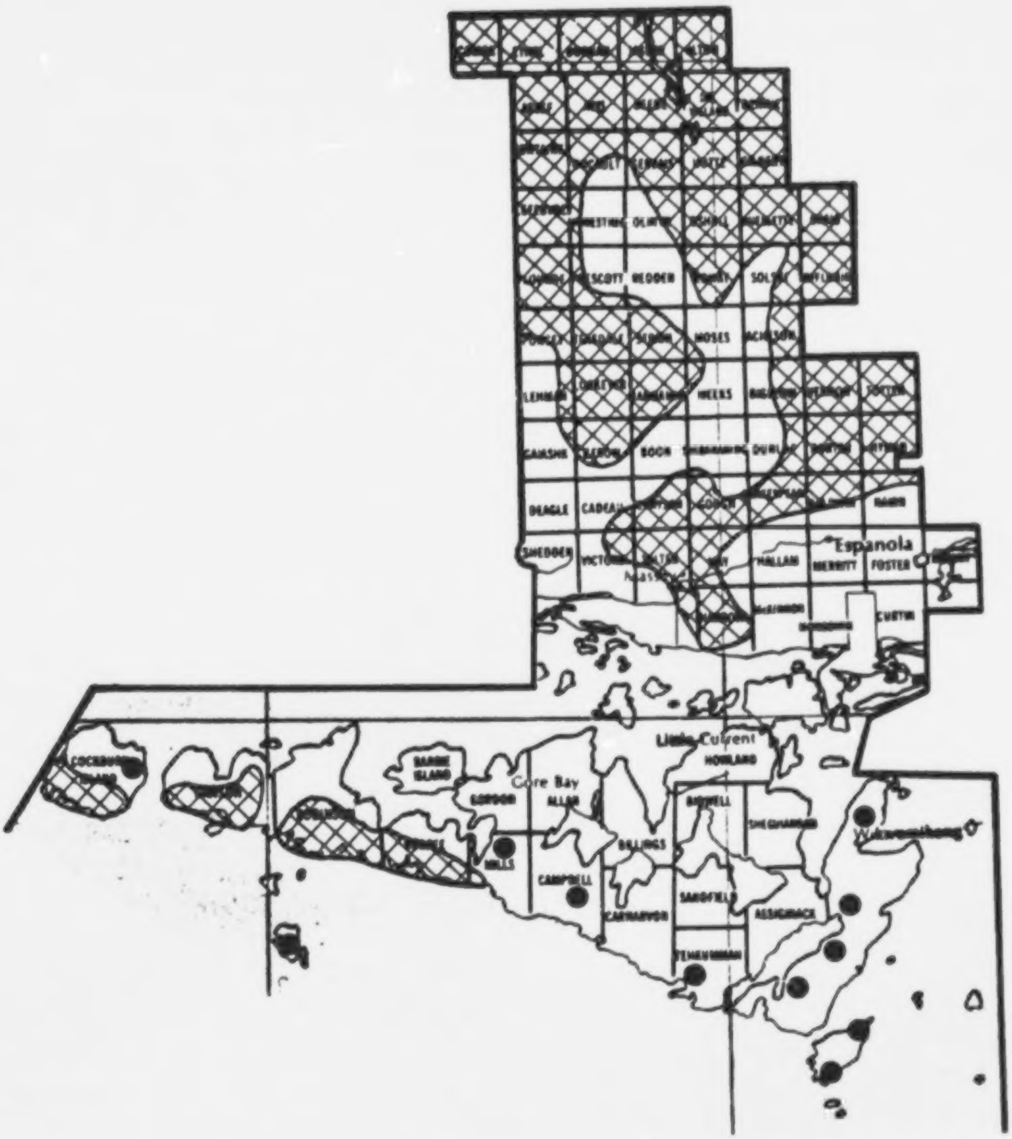
LEGEND

Moderate-to-severe defoliation ● or ▨

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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Barrie Island
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Gordon
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Campbell
Carnarvon
Sandfield
Bidwell
Sheguiandah
Assiginack
Tehkummah
Wikwemikong

Spruce Budworm

Areas within which defoliation occurred in 1973

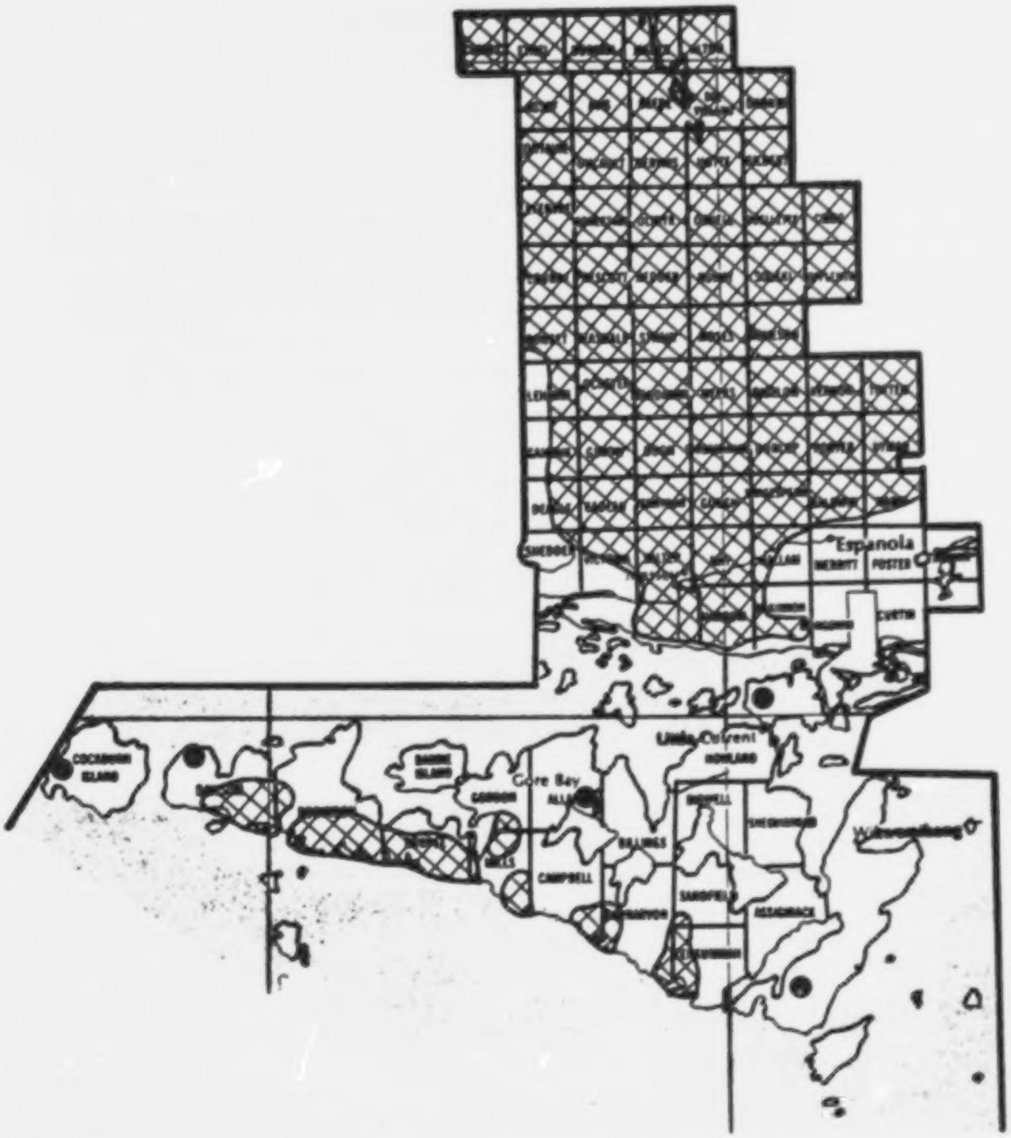
Scale

Kilometres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ● or ▨

ESPANOLA DISTRICT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ASSIGINACK
COCKBURN ISLAND
BARRIE ISLAND
Wikwemikong

Spruce Budworm

Areas within which defoliation
occurred in 1974

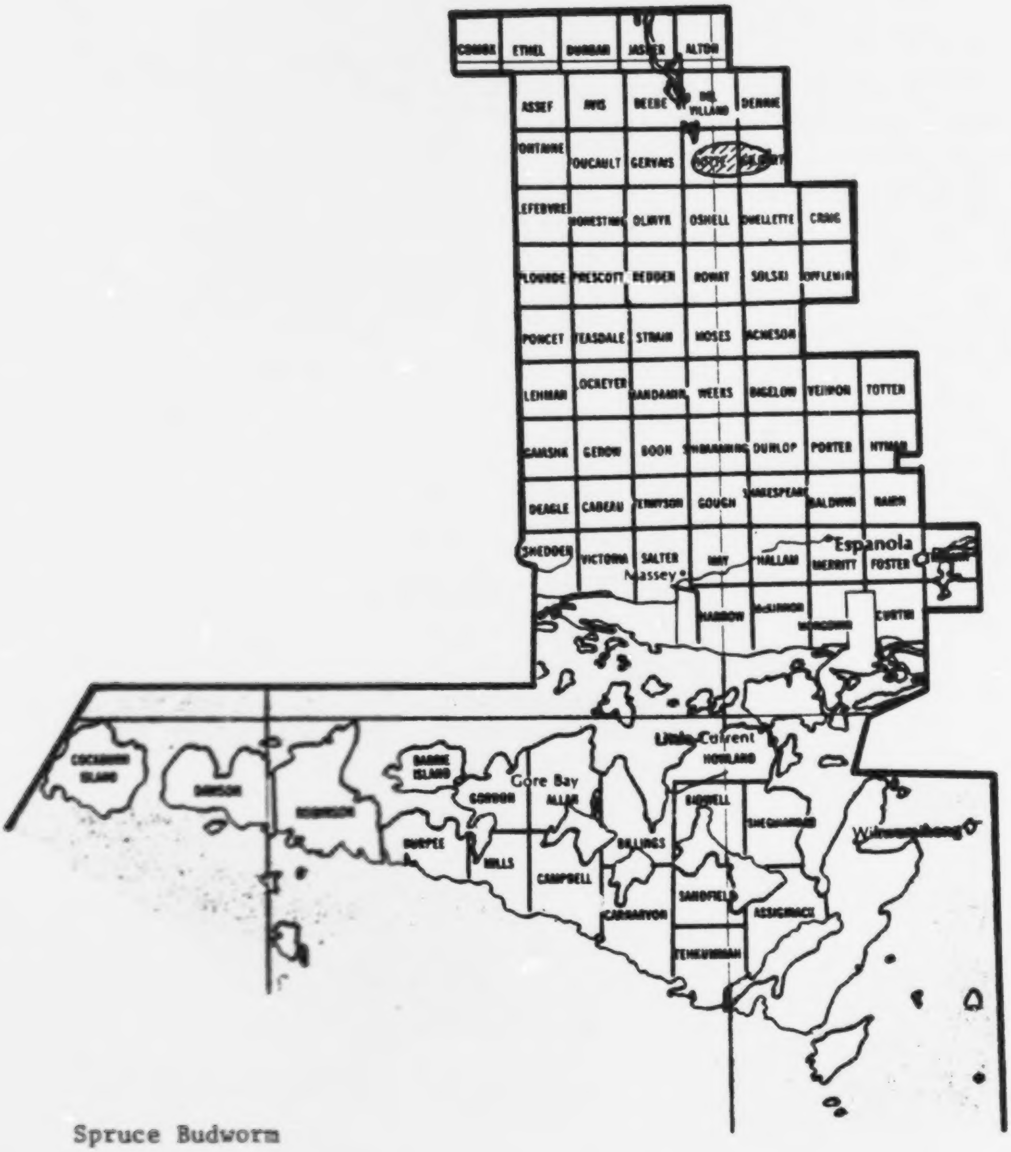
LEGEND

Moderate-to-severe defoliation ● or ▨

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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HOWLAND
BIDWELL
SHEGUIANDAH
SANDFIELD
ASSIGINACK
TEHKUMMAH
Wikwemikong

Spruce Budworm

Areas within which whole tree and top mortality occurred in 1974

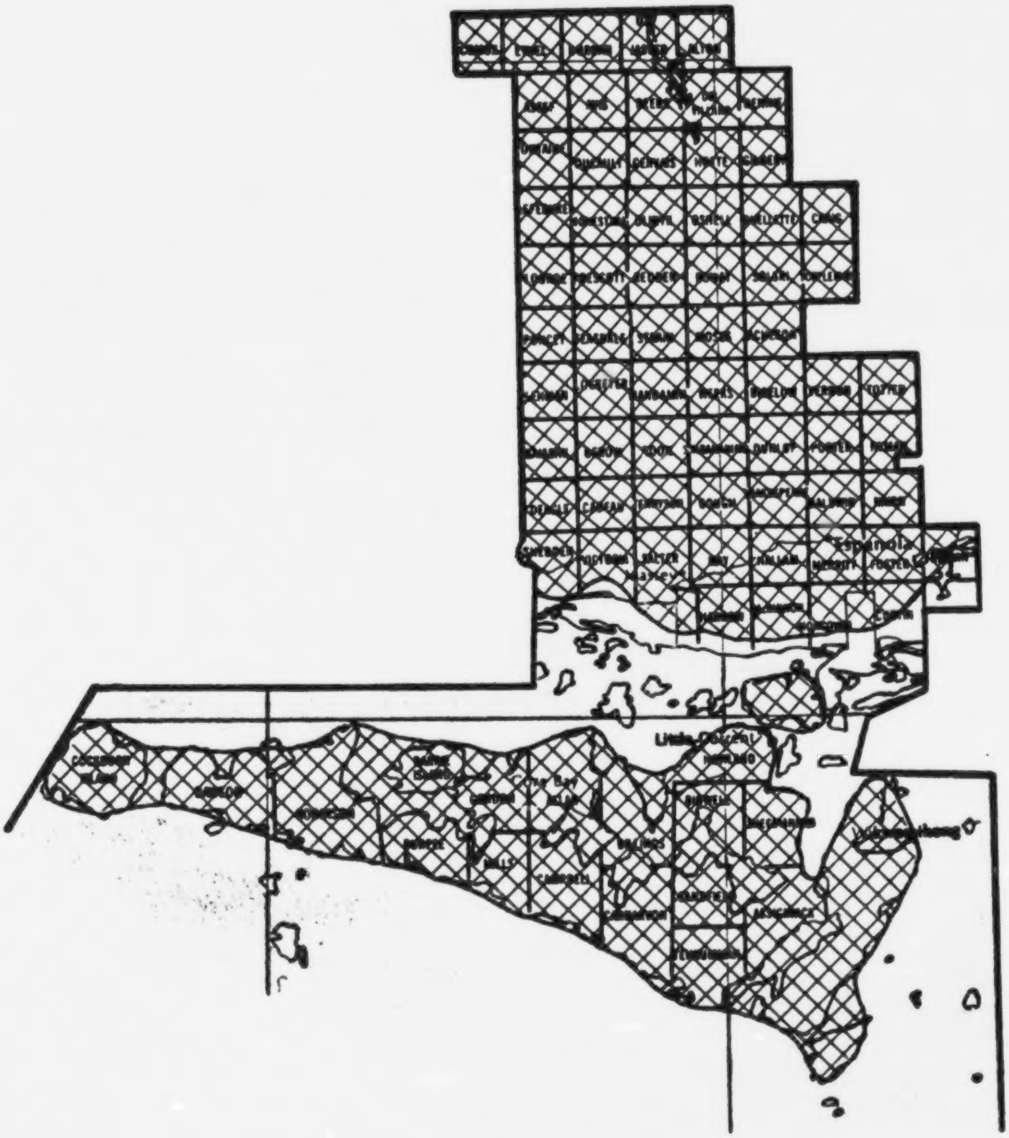
LEGEND

Mortality ▨

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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Little Current

Spruce Budworm

Areas within which defoliation occurred in 1975

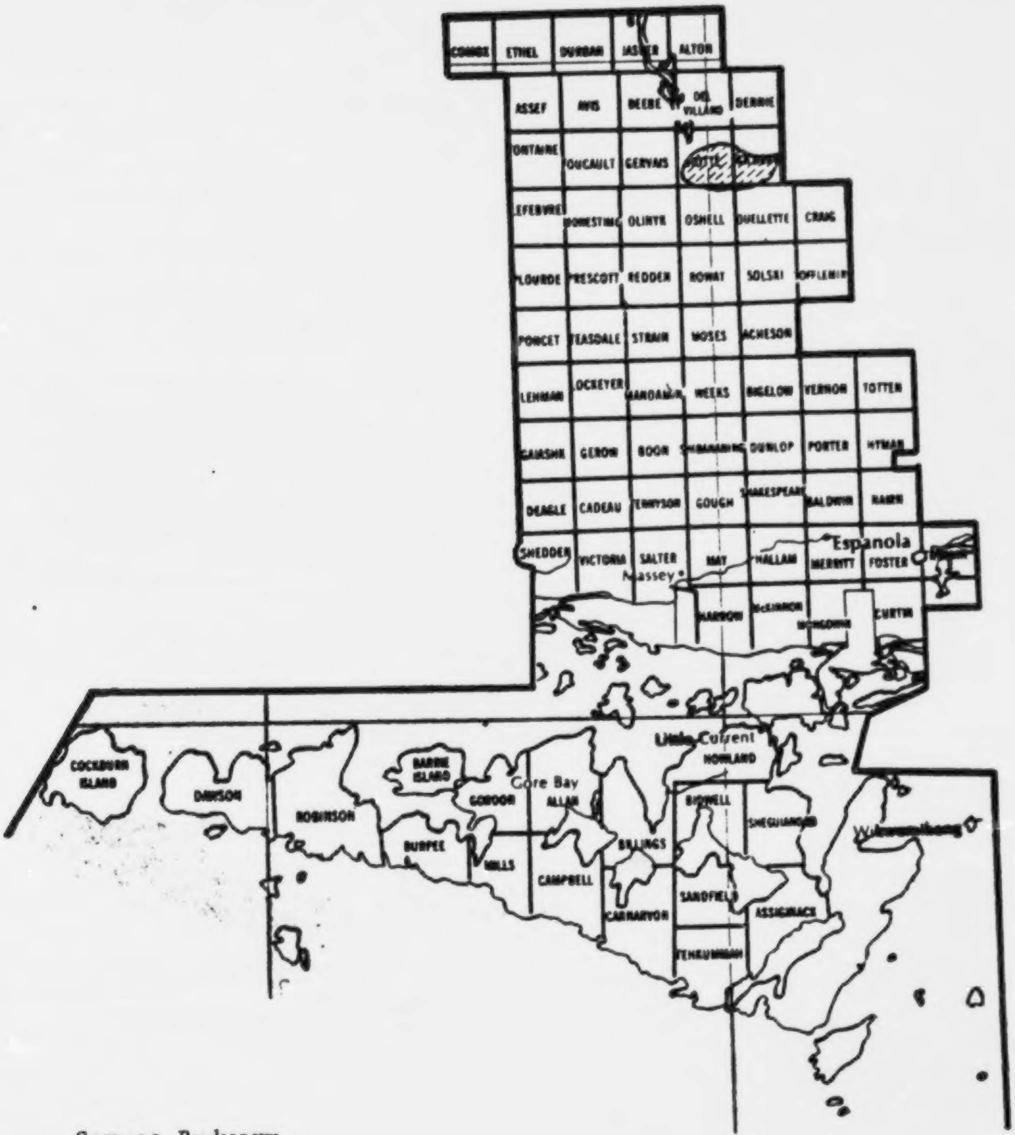
Scale

Kilometres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ⦶ or ▨

ESPANOLA DISTRICT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SANDFIELD
ASSIGINACK
TEHKUMMAH
Wikwemikong

Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1975

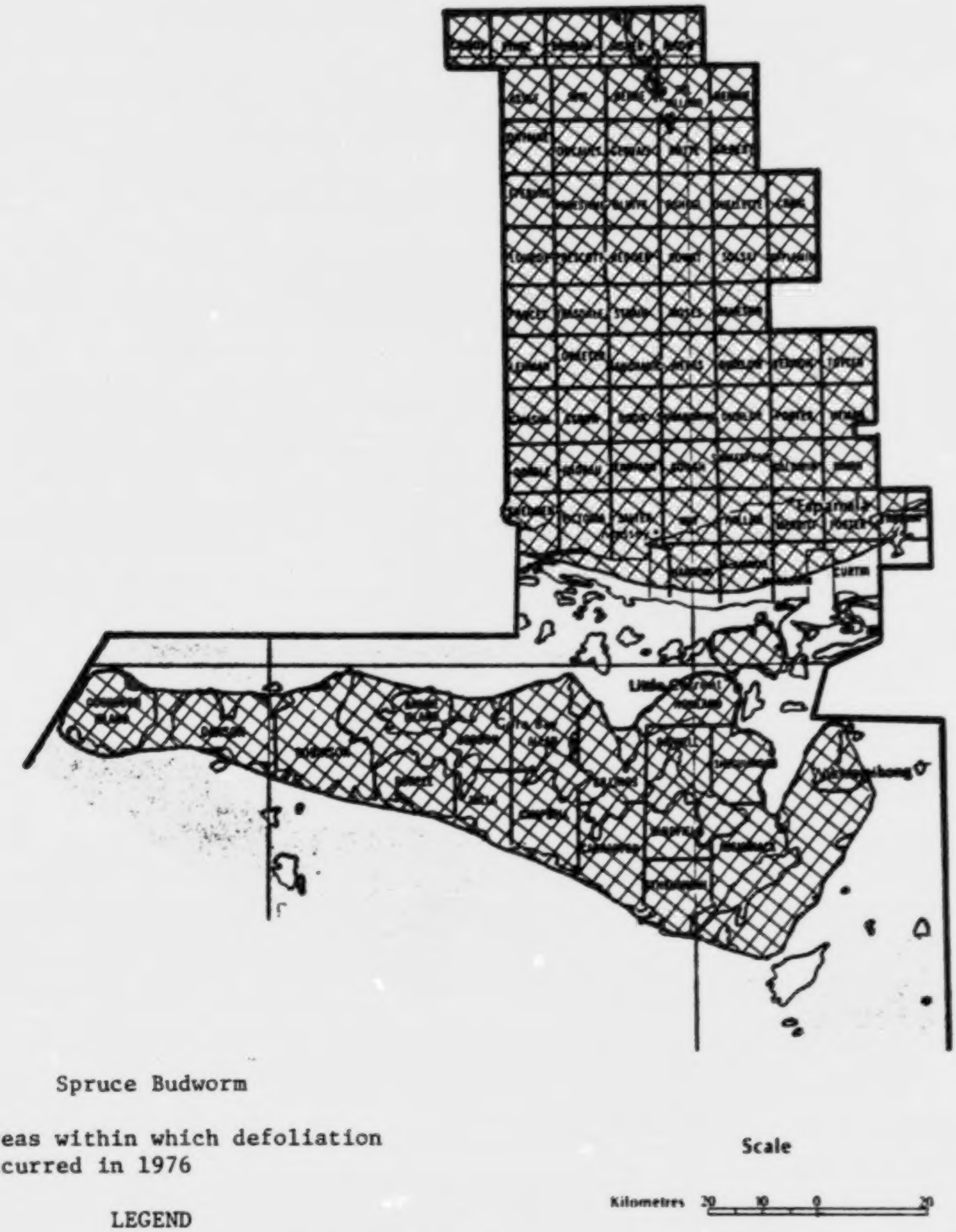
LEGEND

Mortality ▨

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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Little Current
CURTIN

Spruce Budworm

Areas within which defoliation occurred in 1976

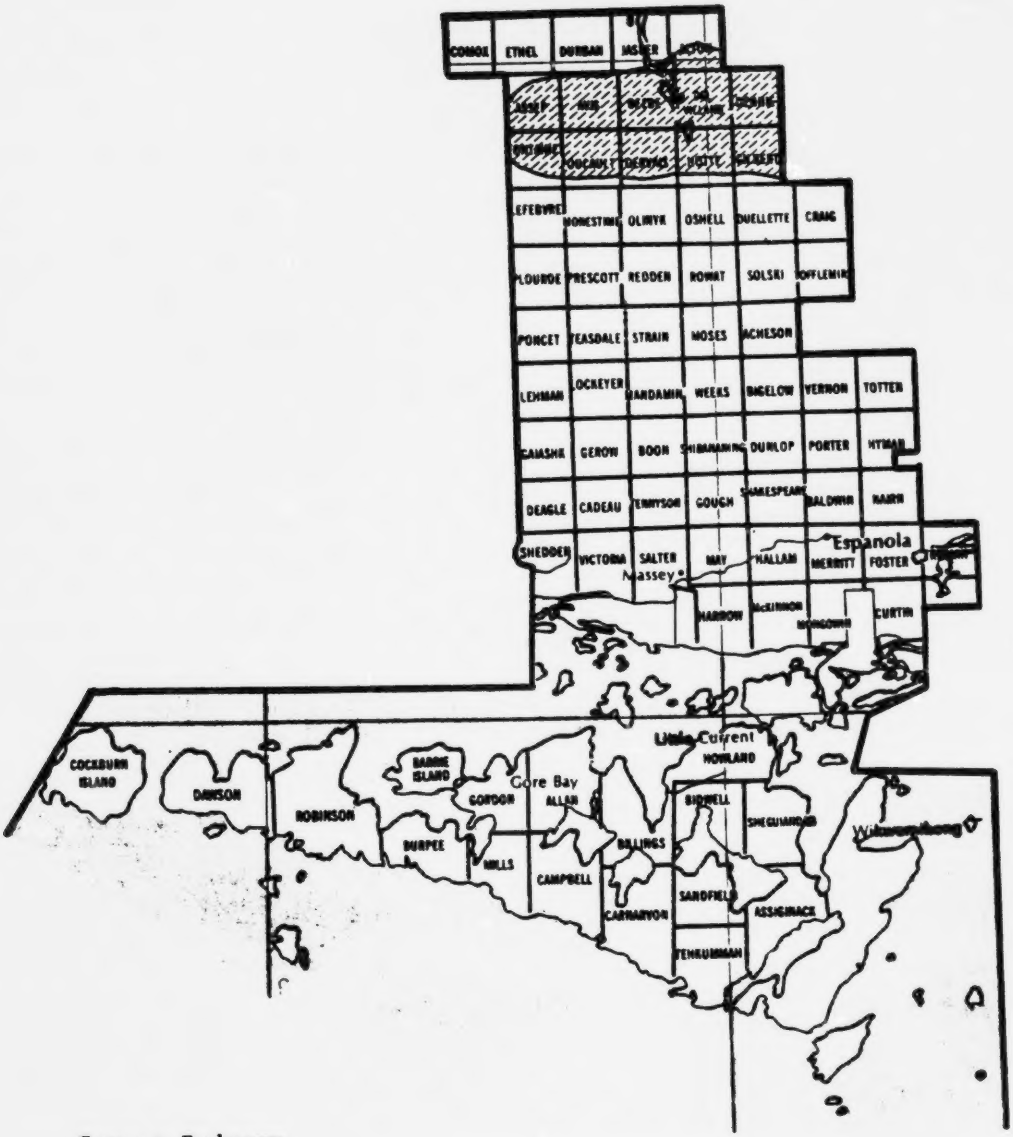
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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TEHKUMMAH

Spruce Budworm

Areas within which balsam fir
whole tree and top mortality
occurred in 1976

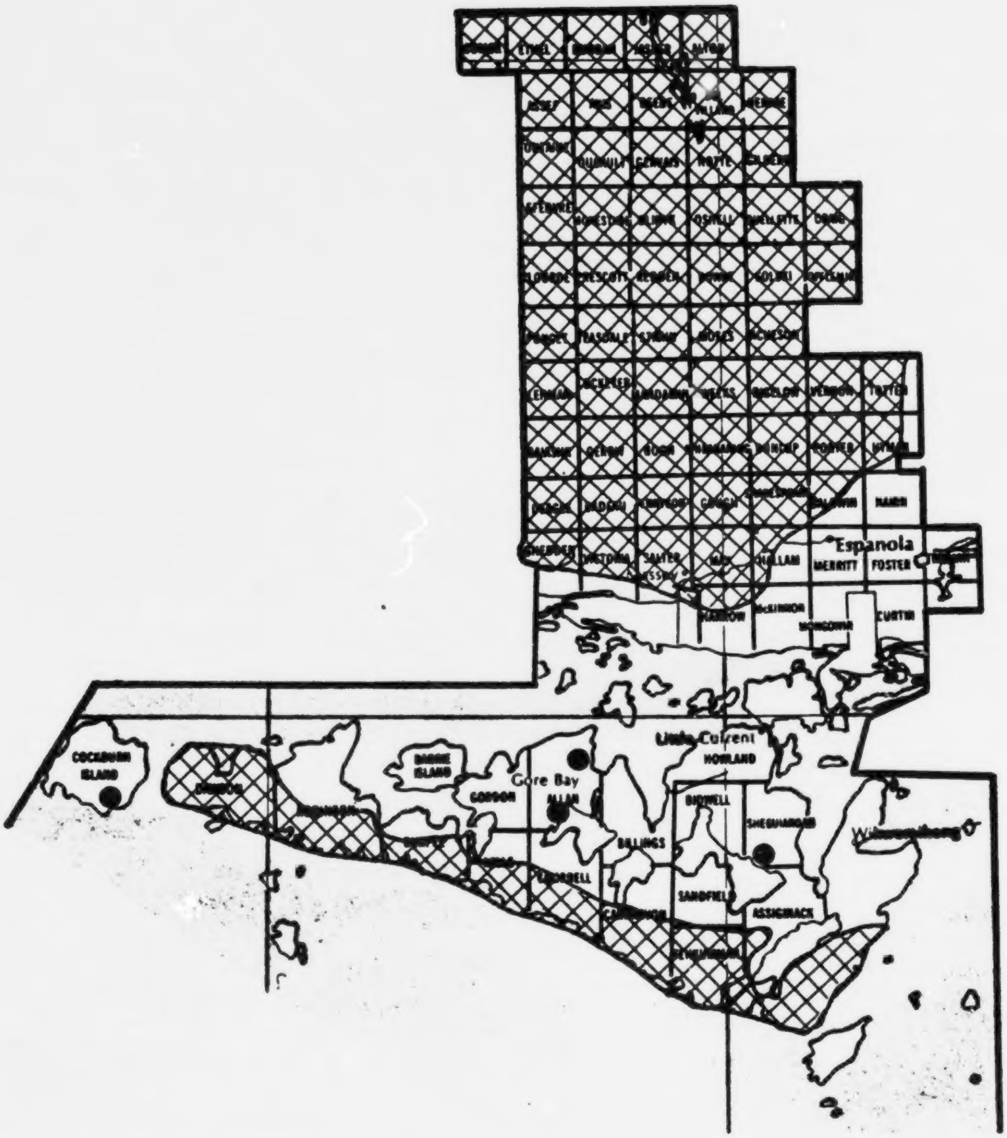
LEGEND

Mortality ▨

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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BURPEE
Wikwemikong

Spruce Budworm

Areas within which defoliation occurred in 1977

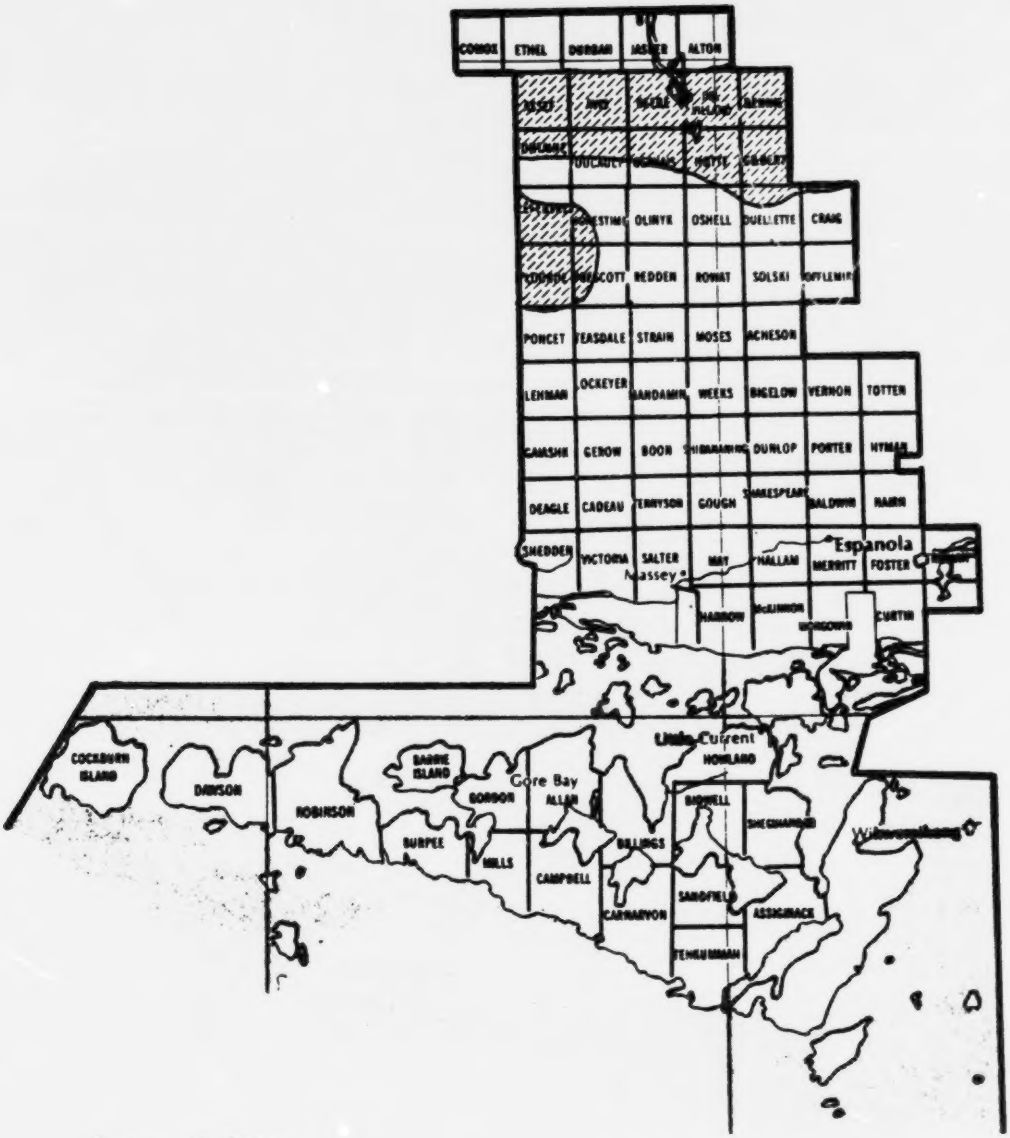
Scale

Kilometres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ● or ▨

ESPANOLA DISTRICT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ASSIGINACK
TEHKUMMAH

Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1977

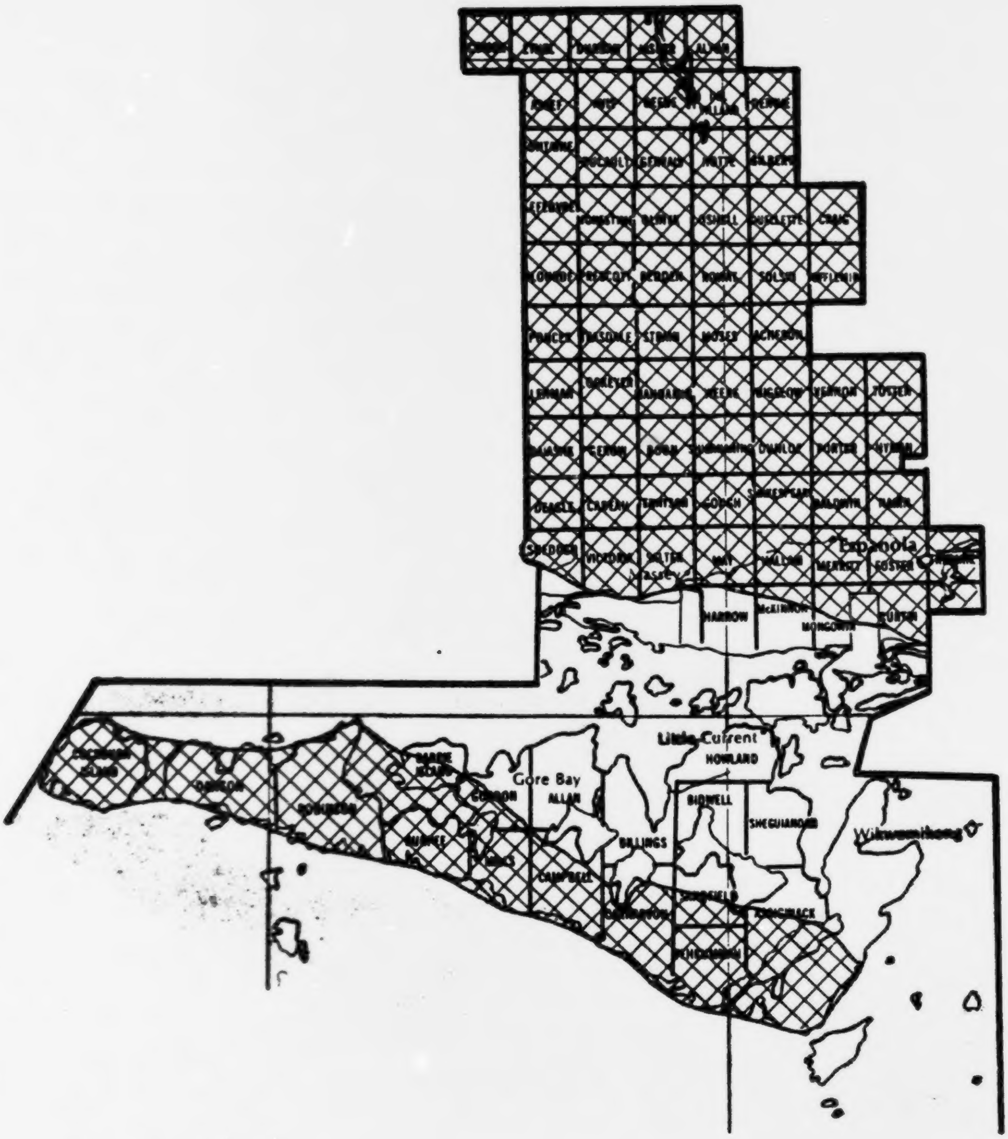
LEGEND

Mortality ▨

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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CARNARVON
SANDFIELD
ASSIGINACK
TEHKUMMAH

Spruce Budworm

Areas within which defoliation occurred in 1978

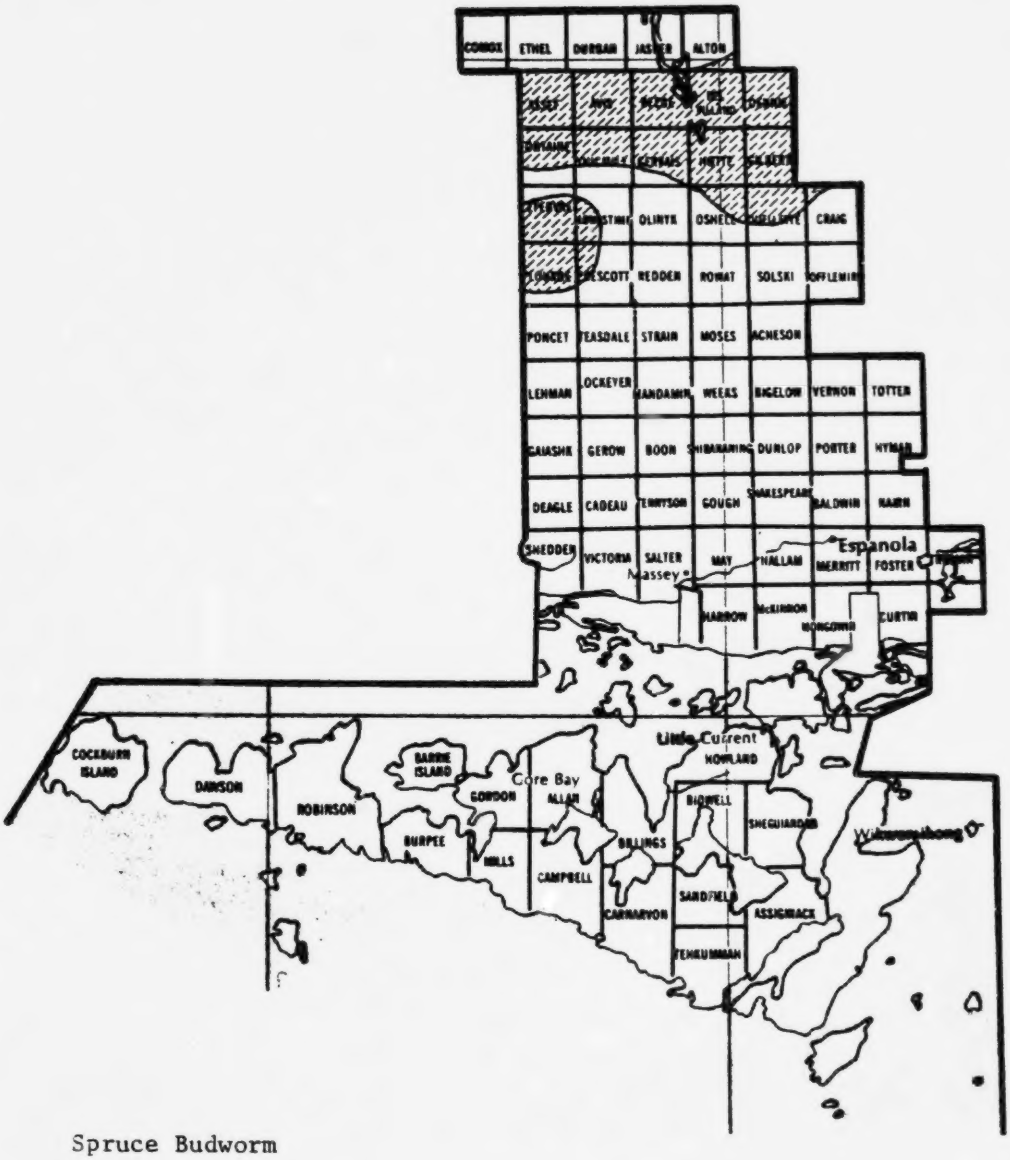
Scale

Kilometres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ▨

ESPANOLA DISTRICT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Wikwemikong
SANDFIELD
ASSIGINACK
CARNARVON
TEHKUMMAH

Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1978

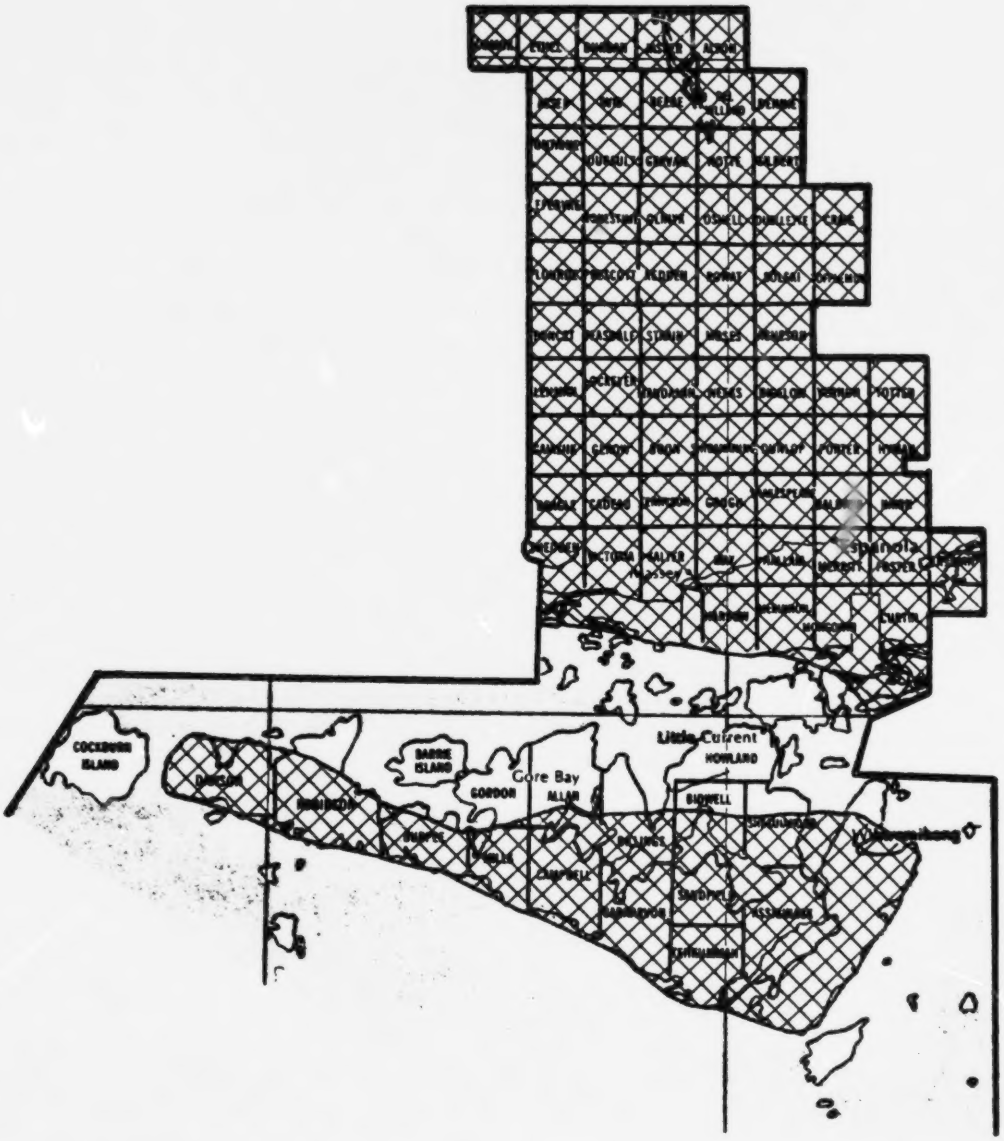
LEGEND

Mortality ▨

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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COCKBURN ISLAND
CAMPBELL

Spruce Budworm

Areas within which defoliation occurred in 1979

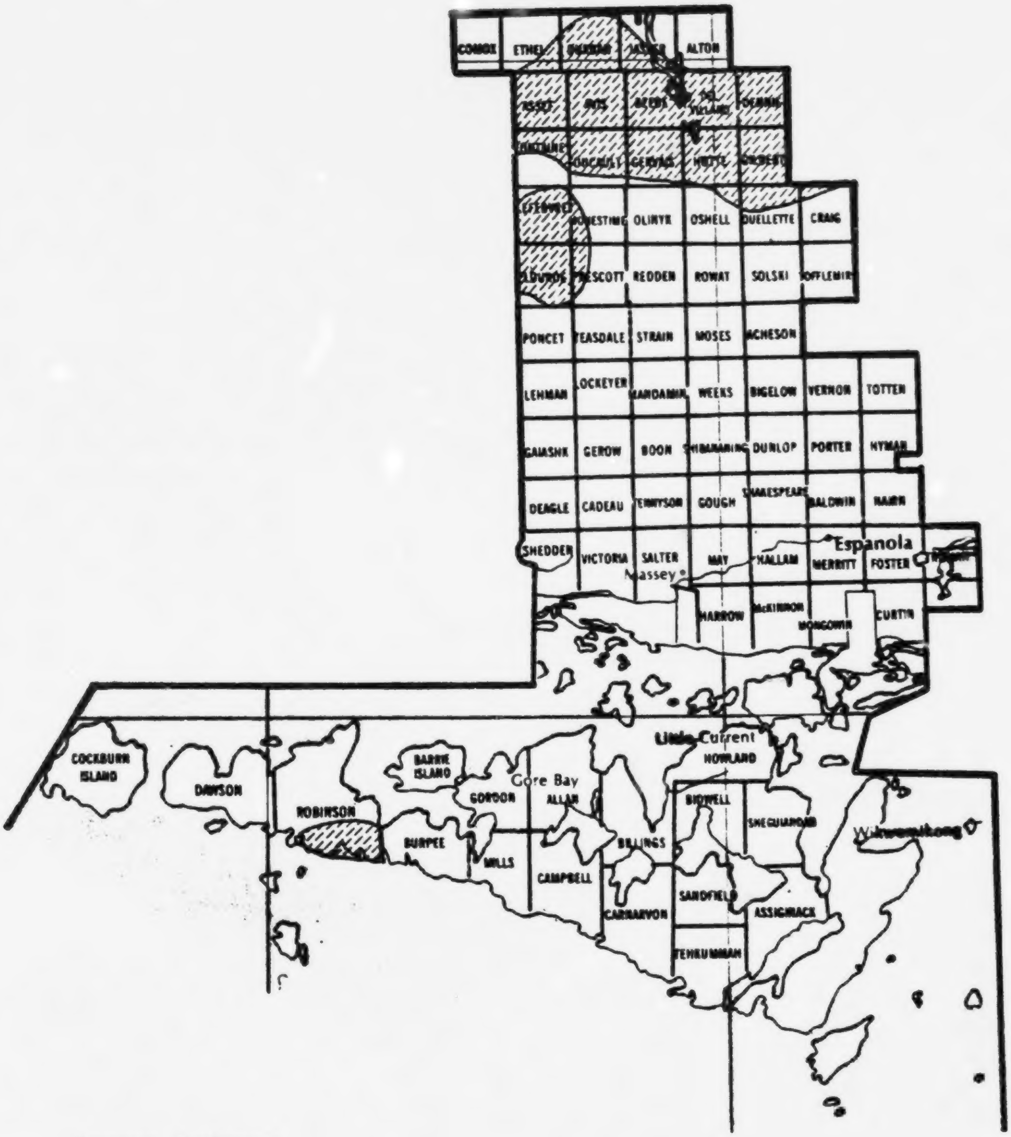
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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ASSIGINACK
TEHKUMMAH

Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1979

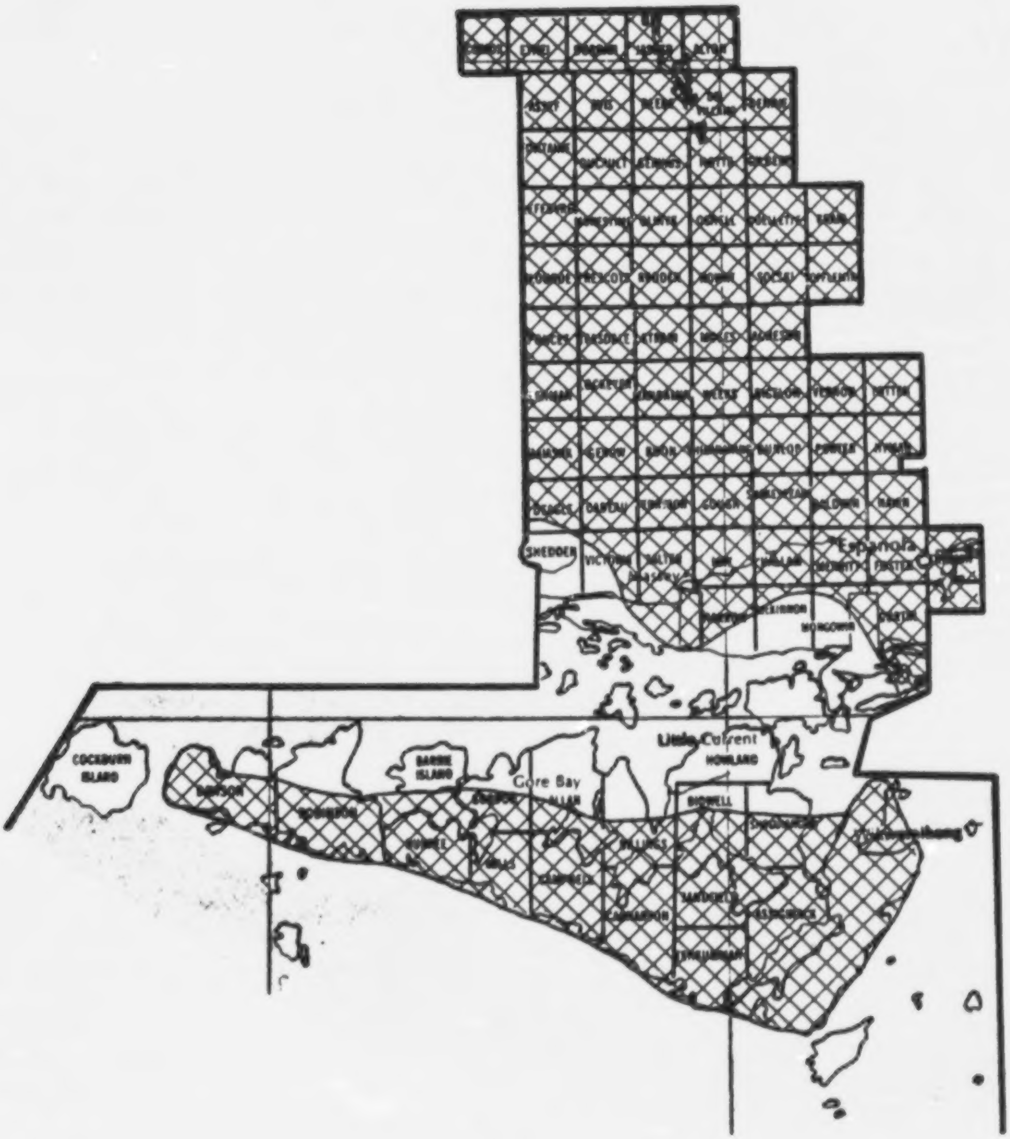
LEGEND

Mortality ▨

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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CAMPBELL
CARNARVON
DAWSON

Spruce Budworm

Areas within which defoliation occurred in 1980

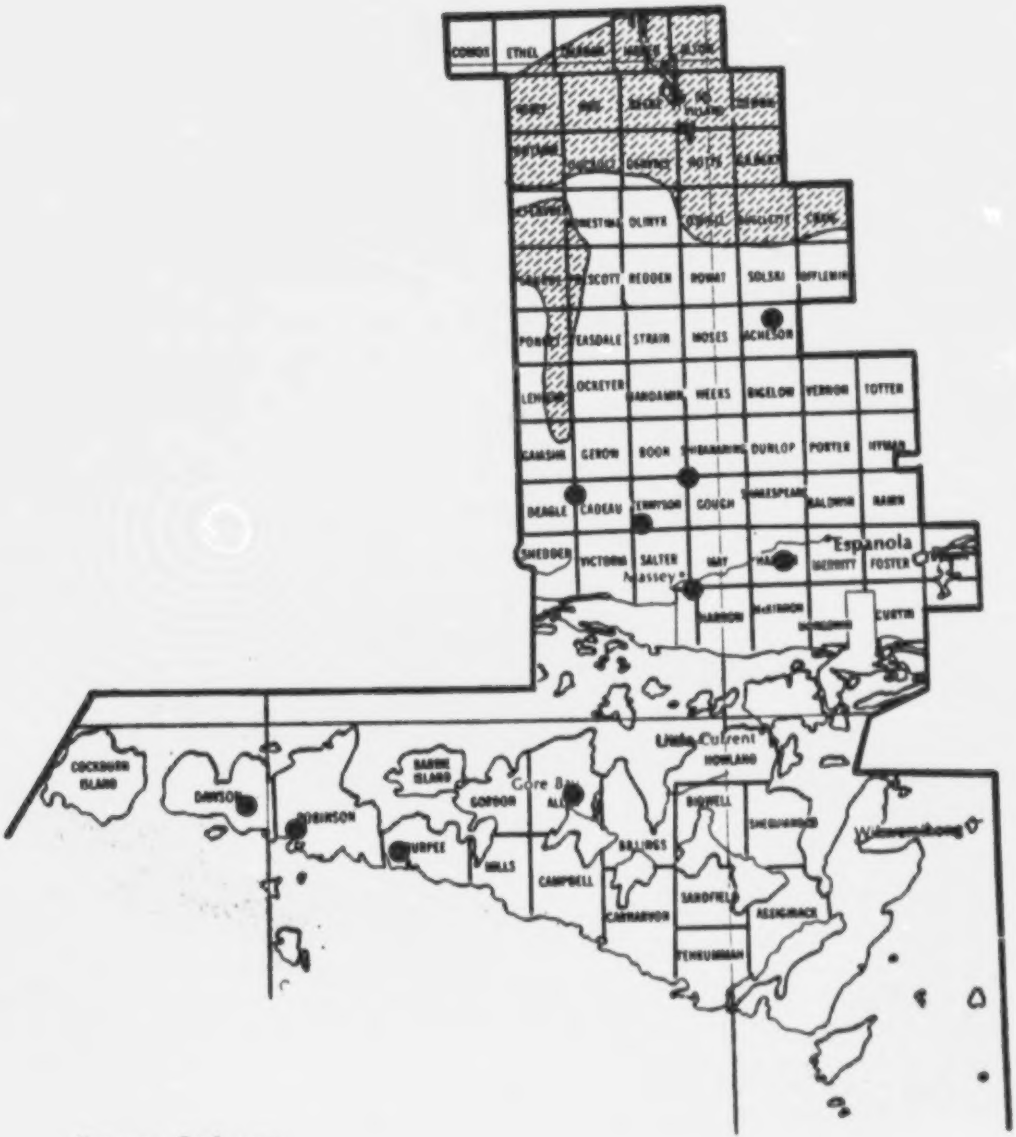
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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SANDFIELD
ASSIGINACK
TEHKUMMAH

Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1980

LEGEND

Mortality ● or ▨

Scale

Kilometres 20 10 0 20

Jack Pine Budworm, *Choristoneura pinus pinus* Free.

Host(s): wP,sP,rP,jP [Major]

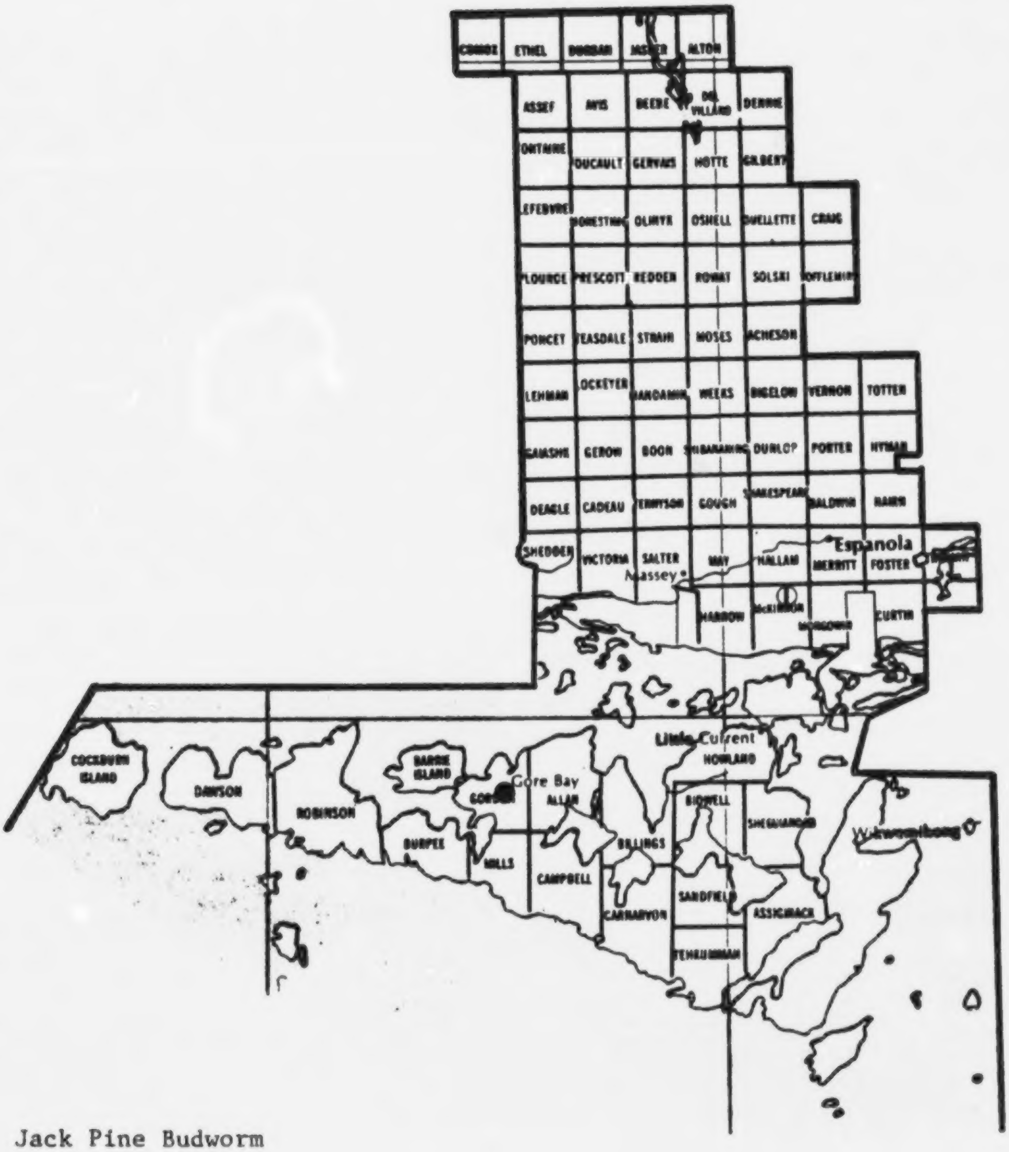
Year	Remarks
1950	Low numbers were collected in Fontaine Twp.
1951-1957	not reported
1958	A light infestation was recorded on large open-growing trees in Nairn Twp.
1959-1961	Low numbers of larvae were collected at selected sample points.
1962	A few larvae were collected in Nairn Twp.
1963	not reported
1964	Low numbers of larvae were collected in Alton Twp.
1965	Pockets of light infestation were recorded on Great La Cloche Island and in Nairn Twp. Elsewhere small numbers were observed in most jack pine stands in the district.
1966	Some Scots pine plantations on Manitoulin Island suffered moderate-to-severe defoliation. Larvae were common in Beebe and Del Villano twps.
1967	There was repeated moderate-to-severe defoliation of Scots pine in Billings and Gordon twps on Manitoulin Island. Light damage was detected in Avis Twp.
1968	Moderate-to-severe defoliation of Scots pine continued in Gordon Twp. A light infestation was observed in Hallam Twp (see map, page 50).
1969	High populations for the fourth consecutive year caused moderate-to-severe defoliation in Gordon Twp. Low populations were detected in Nairn Twp.
1970	High populations continued to cause moderate-to-severe defoliation of Scots pine in Gordon Twp. Light defoliation was recorded in Carnarvon and Billings twps.
1971	The persistent moderate-to-severe infestation in Gordon Twp declined to light intensity.

(cont'd)

Jack Pine Budworm, *Choristoneura pinus pinus* Free. (concl.)

Year	Remarks
1972	Low populations continued to cause light defoliation in Gordon Twp.
1973	Small numbers were collected in Merritt, Gordon and Dawson twps.
1974-1975	Low populations were present in the district.
1976-1980	not reported

ESPANOLA DISTRICT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HOWLAND
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SHEGUIANDAH
SANDFIELD
ASSIGINACK
TEHKUMMAH
Wikwemikong

Jack Pine Budworm

Areas within which defoliation occurred in 1968

Scale

Kilometres 20 10 0 20

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ●

Greenstriped Mapleworm, *Dryocampa rubicunda rubicunda* (Fabr.)

[Major]

Host(s): maple

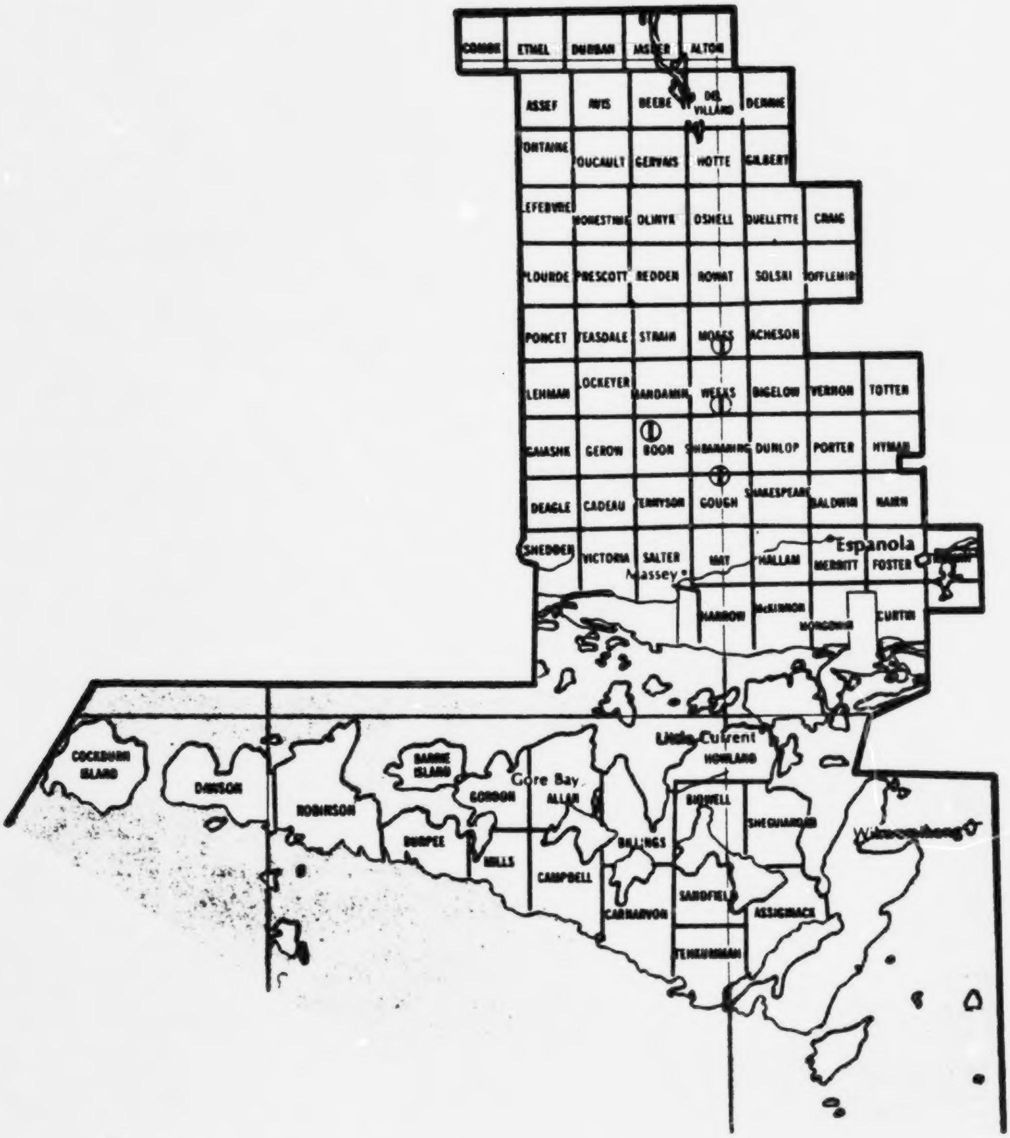
Year	Remarks
1950	Low numbers were collected from Tehkummah and Assiginack twps on Manitoulin Island and a 0.4-ha light-to-moderate infestation was recorded in Hyman Twp.
1951-1952	not reported
1953	Low numbers were collected in Gough Twp and a moderate-to-severe infestation was recorded in Moses Twp.
1954	Light-to-moderate defoliation was recorded in Moses, Boon, Weeks and Gough twps (see map, page 53).
1955	Light-to-moderate defoliation was recorded in Strain, Gough, Shakespeare and Robinson twps. Severe damage was observed in Moses Twp (see map, page 54).
1956	Low numbers were collected in Gough Twp and a light infestation recurred in Robinson Twp (see map, page 55).
1957	Low populations were detected in the central and southern parts of the district and a light-to-moderate infestation was recorded in Moses Twp.
1958	Low numbers were collected in the central and southern parts of the district and pockets of light defoliation were detected in Robinson Twp.
1959	A general decline in numbers was observed throughout the district, with some scattered colonies being detected on Manitoulin Island.
1960	Scattered colonies were collected in the central portion of the district.
1961-1964	not reported
1965	An isolated colony was collected on Cockburn Island.
1966-1967	Scattered colonies were collected on Cockburn Island.
1968	Small numbers were collected in Victoria Twp.

(cont'd)

Greenstriped Mapleworm, *Dryocampa rubicunda rubicunda* (Fabr.) (concl.)

Year	Remarks
1969	not reported
1970	not reported
1971	Approximately 1000 ha of maple on Cockburn Island suffered moderate-to-severe defoliation.
1972	The intensity of the Cockburn Island infestation declined from the previous year, but was still moderate to severe.
1973	Increased populations caused moderate-to-severe defoliation on Cockburn Island.
1974	Previous high populations declined to low numbers.
1975	Pockets of moderate-to-severe defoliation were recorded on Cockburn Island and in Carnarvon Twp.
1976	Moderate-to-severe defoliation was recorded in an area in Carnarvon Twp.
1977	The previous high populations in Carnarvon Twp declined to low numbers.
1978-1980	not reported

ESPANOLA DISTRICT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SANDFIELD
ASSIGINACK
TEHKUMMAH

Greenstriped Mapleworm

Areas within which defoliation occurred in 1954

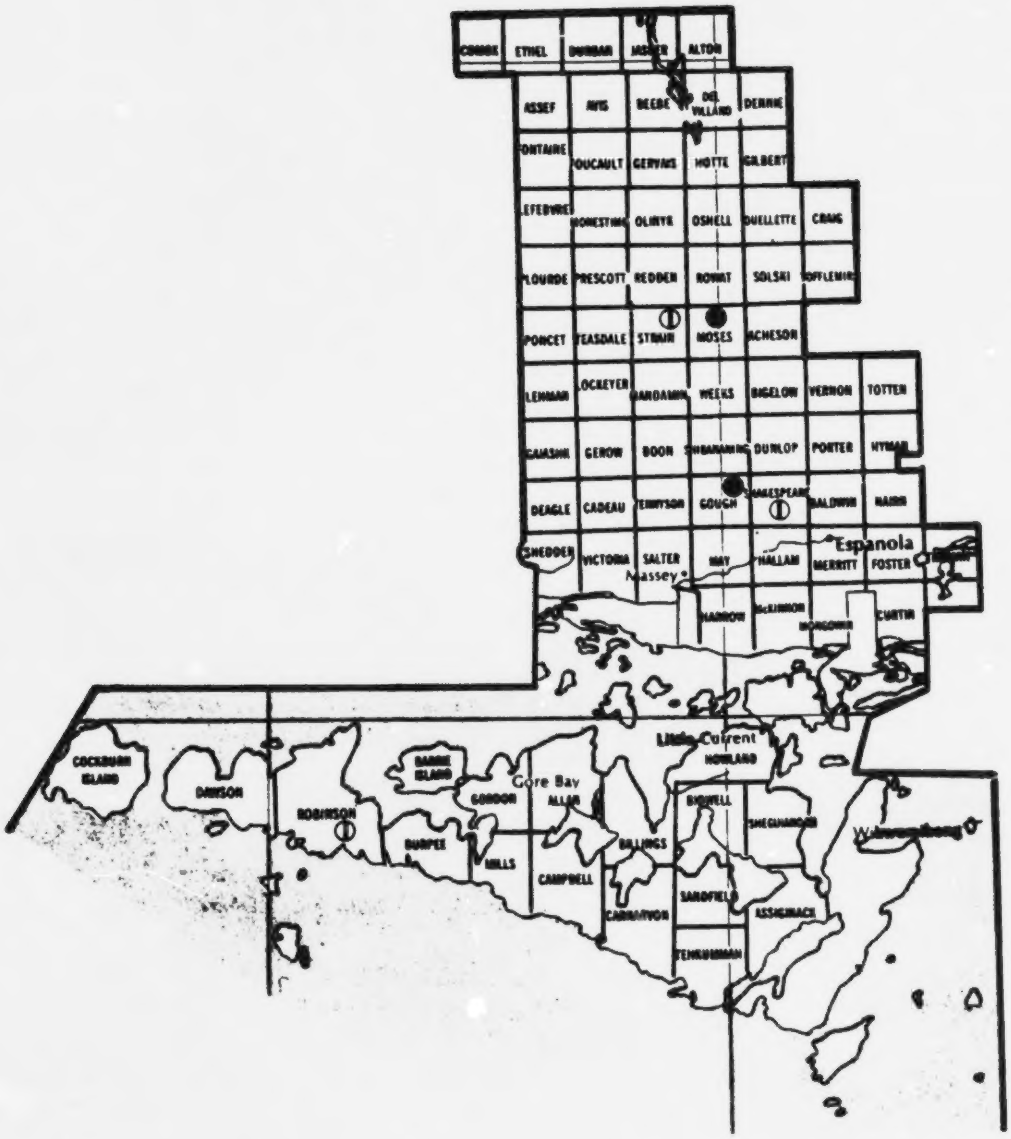
LEGEND

Light defoliation ⦶

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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Greenstriped Mapleworm

Areas within which defoliation occurred in 1955

LEGEND

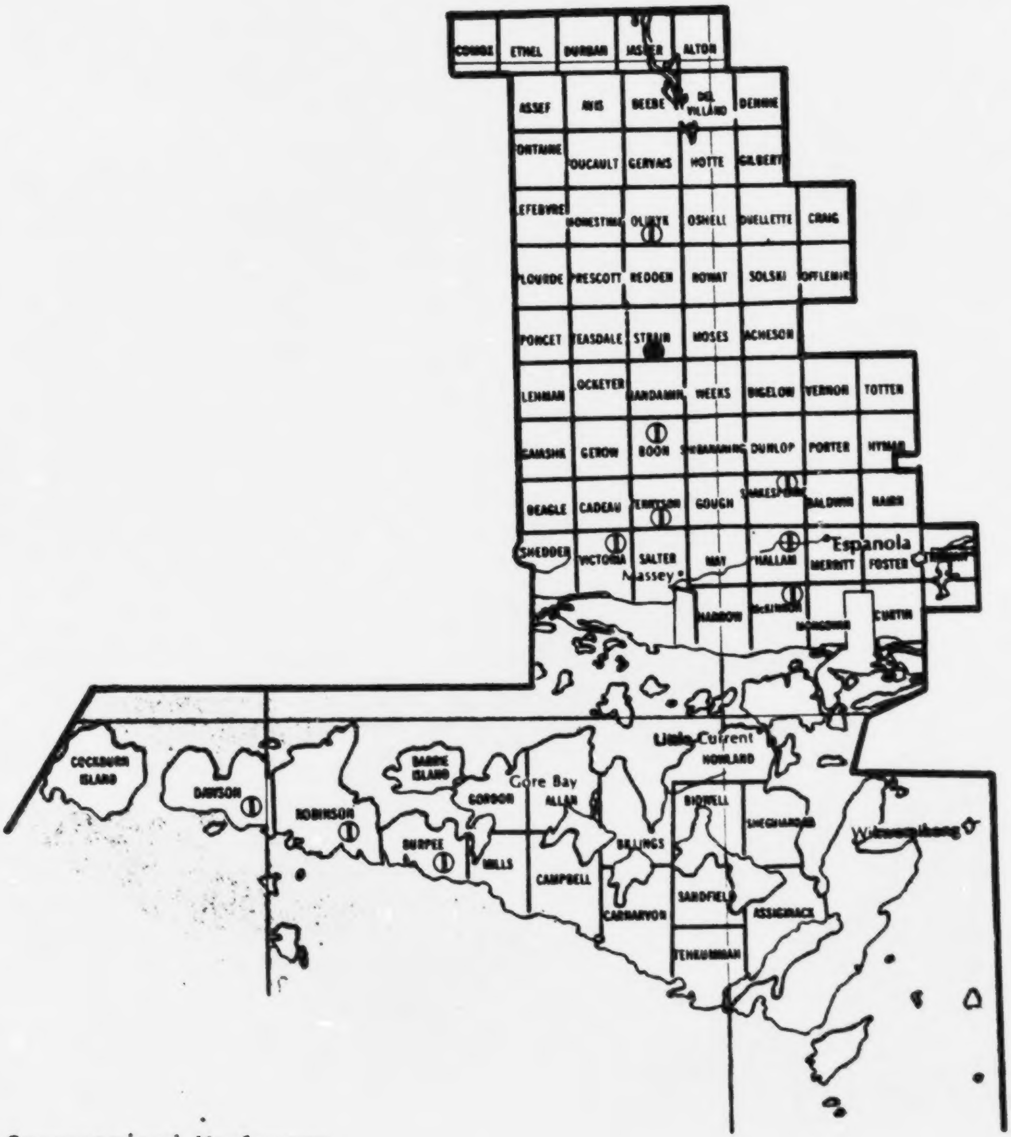
Light defoliation ◐

Moderate-to-severe defoliation ●

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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SANDFIELD
ASSIGINACK
CARNARVON
TEHKUMMAH

Greenstriped Mapleworm

Areas within which defoliation occurred in 1956

Scale

Kilometres 20 10 0 20

LEGEND

Light defoliation ⦶

Moderate-to-severe defoliation ●

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

Host(s): tA,wB,rO [Major]

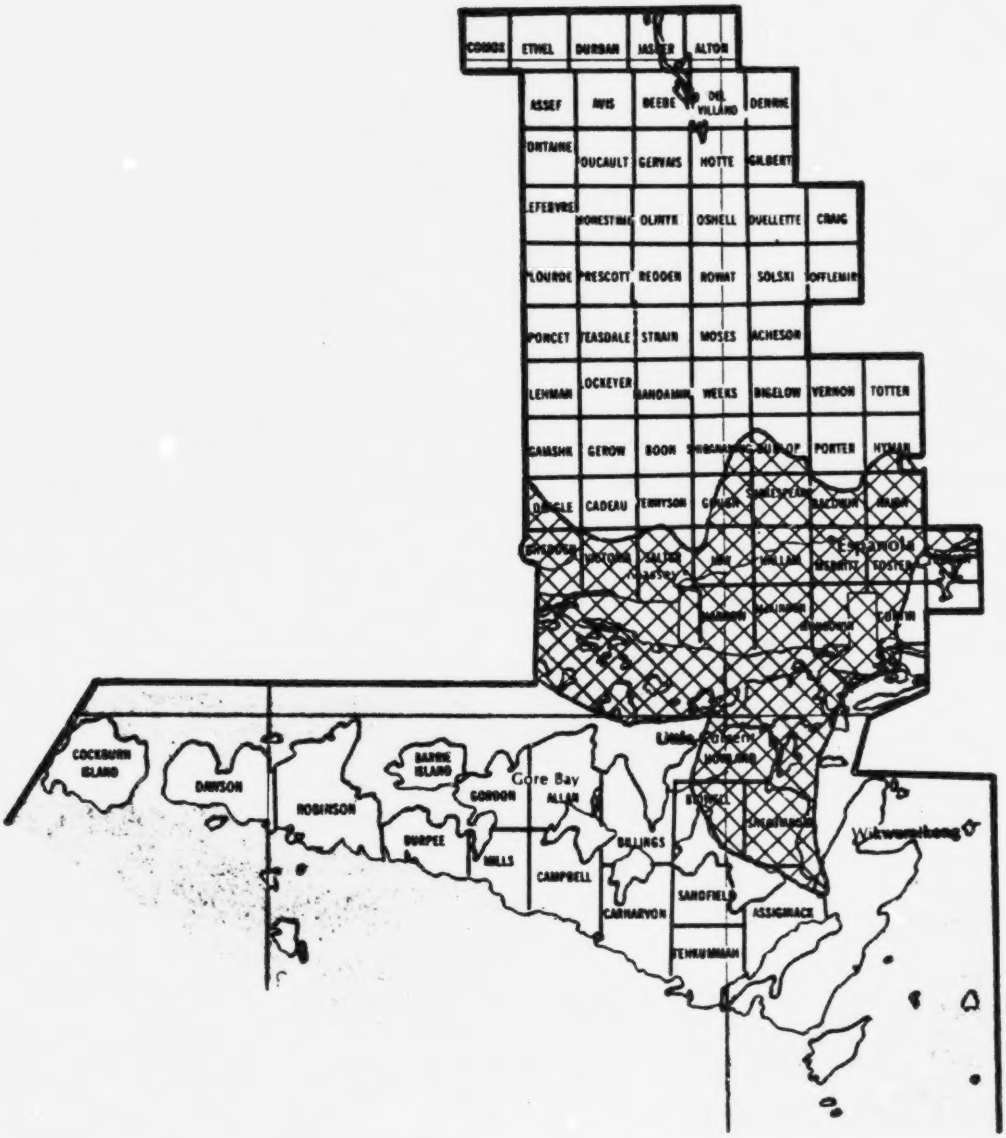
Year	Remarks
1950	The 8-ha pocket of severe infestation on Manitoulin Island in 1949 spread to encompass 14,000 ha in 1950 (see map, page 58).
1951	The southern half of the district including Manitoulin Island experienced moderate-to-severe defoliation (see map, page 59).
1952	Except for the 15 most northerly townships, the entire district experienced moderate-to-severe defoliation (see map, page 60).
1953	The infestation declined in the southern two-thirds of the district to areas of light defoliation. Seven townships in the northeastern part suffered severe defoliation (see map, page 61).
1954	The infestation in the Espanola District collapsed, although areas of moderate-to-severe defoliation occurred in the adjacent districts of Sudbury and Chapleau (see map, page 62).
1955-1961	not reported
1962	Pockets of light infestation were observed in Merritt, Allan and Cadeau twps.
1963	Light defoliation was observed in Sheguiandah Twp.
1964	not reported
1965	A 25 km^2 area of moderate-to-severe defoliation occurred in Merritt Twp. A small pocket of light damage was observed in Shedden Twp.
1966	Infestations continued in the same areas and at the same intensity as in the previous year.
1967	Pockets of light defoliation were recorded in Merritt, Allan and Carnarvon twps.
1968	High populations occurred in the southwestern part of the district (see map, page 63).
1969	The moderate-to-severe infestation in Shedden and Deagle twps continued and an area of light defoliation was detected in Billings Twp (see map, page 64).

(cont'd)

Forest Tent Caterpillar, *Malacosoma disstria* Hbn. (concl.)

Year	Remarks
1970	populations collapsed
1971-1973	not reported
1974	A small pocket of moderate-to-severe defoliation was recorded in Truman Twp (see map, page 65).
1975	Areas of moderate-to-severe defoliation occurred in the southern portion of the district (see map, page 66).
1976	The infestation in the southeastern part of the district expanded and new areas of moderate-to-severe infestation were detected on the eastern end of Manitoulin Island (see map, page 67).
1977	The moderate-to-severe infestation spread to encompass approximately 5,000 ha (see map, page 68).
1978	High populations created an infestation that extended from Tehkummah Twp to Shakespeare Twp (see map, page 69).
1979	One surviving area of moderate-to-severe defoliation on Manitoulin Island reflected the declining populations (see map, page 70).
1980	An area of moderate-to-severe defoliation occurred 9.6 km west of the town of Espanola (see map, page 71).

ESPANOLA DISTRICT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SANDFIELD
ASSIGINACK
TEHKUMMAH
Wikwemikong

Forest Tent Caterpillar

Areas within which defoliation occurred in 1950

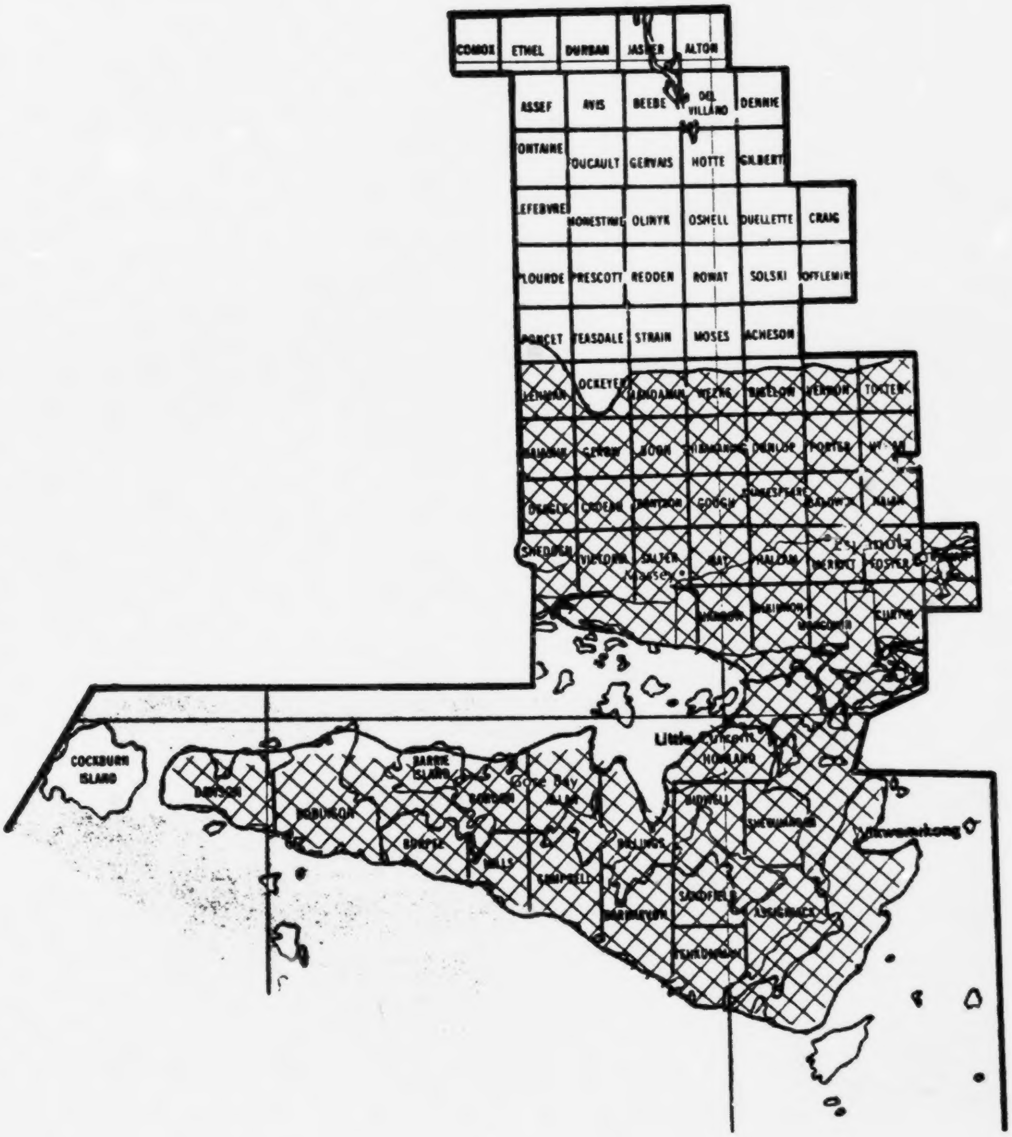
Scale

Kilometres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ▨

ESPANOLA DISTRICT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Forest Tent Caterpillar

Areas within which defoliation occurred in 1951

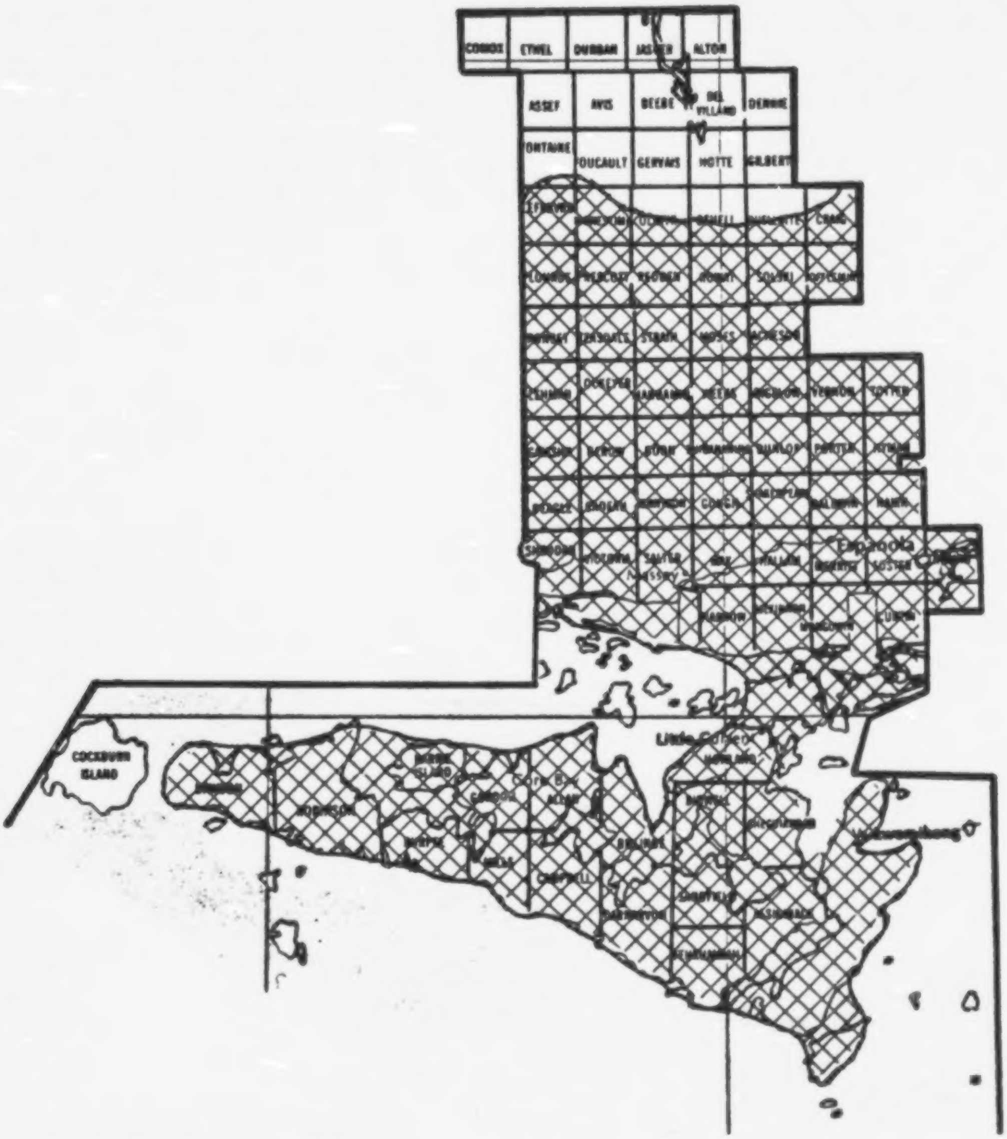
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT


COCKBURN ISLAND
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Scale
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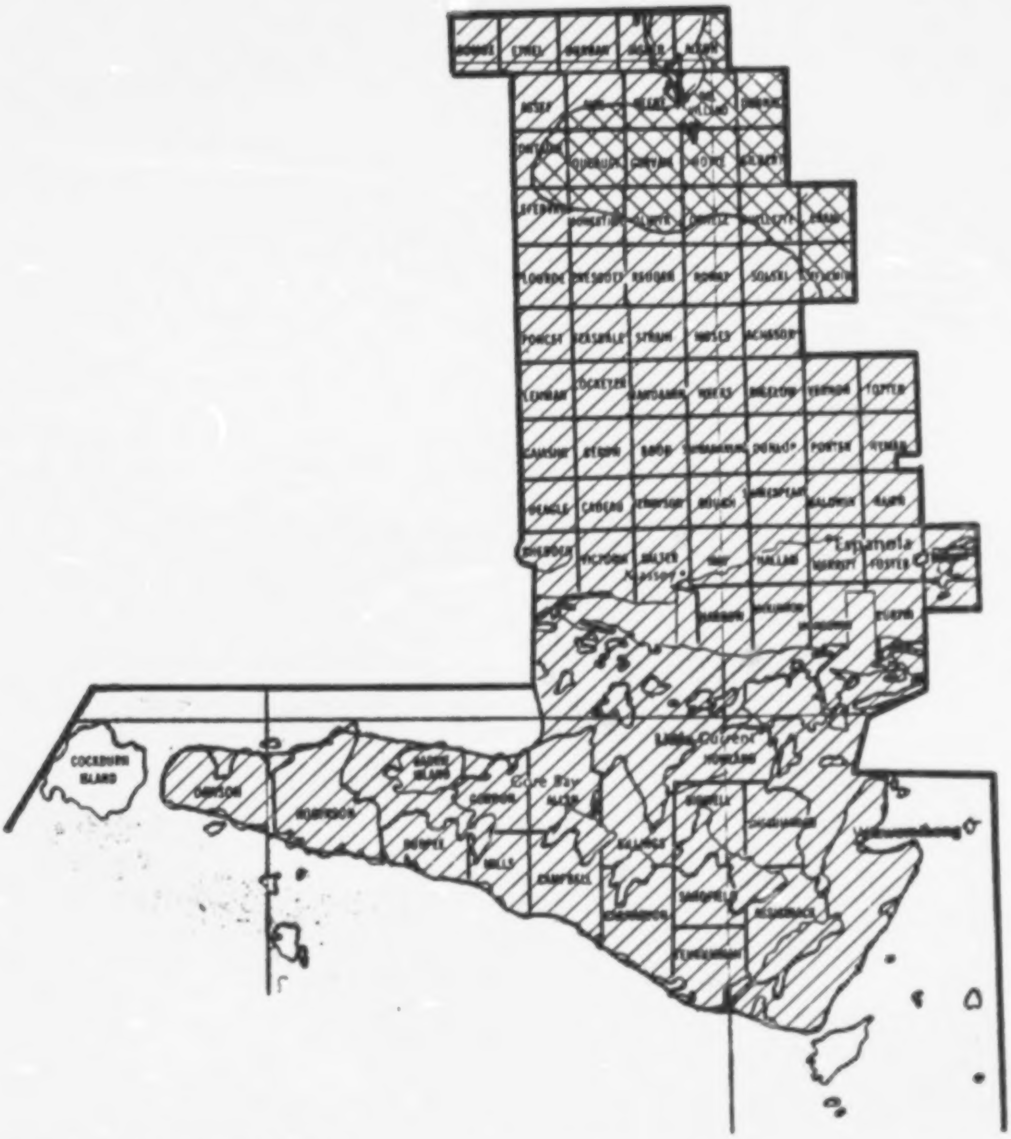
Forest Tent Caterpillar

Areas within which defoliation occurred in 1952

LEGEND

Moderate-to-severe defoliation ▨

ESPANOLA DISTRICT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COCKBURN ISLAND

Forest Tent Caterpillar

Areas within which defoliation occurred in 1953

Scale

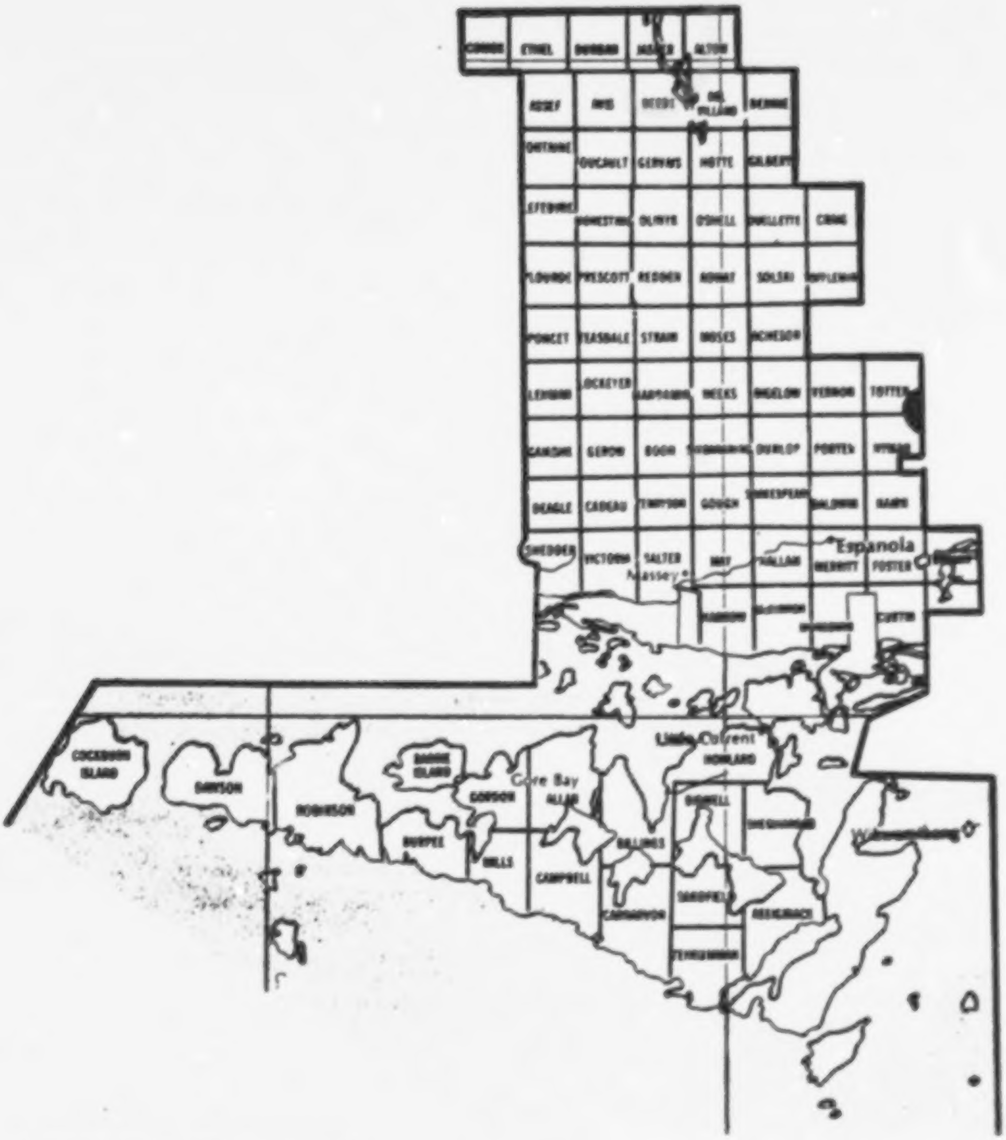
Kilometres 20 10 0 20

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ▩

ESPANOLA DISTRICT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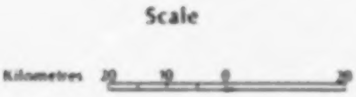
Forest Tent Caterpillar

Areas within which defoliation occurred in 1954

LEGEND

Moderate-to-severe defoliation ●


Scale
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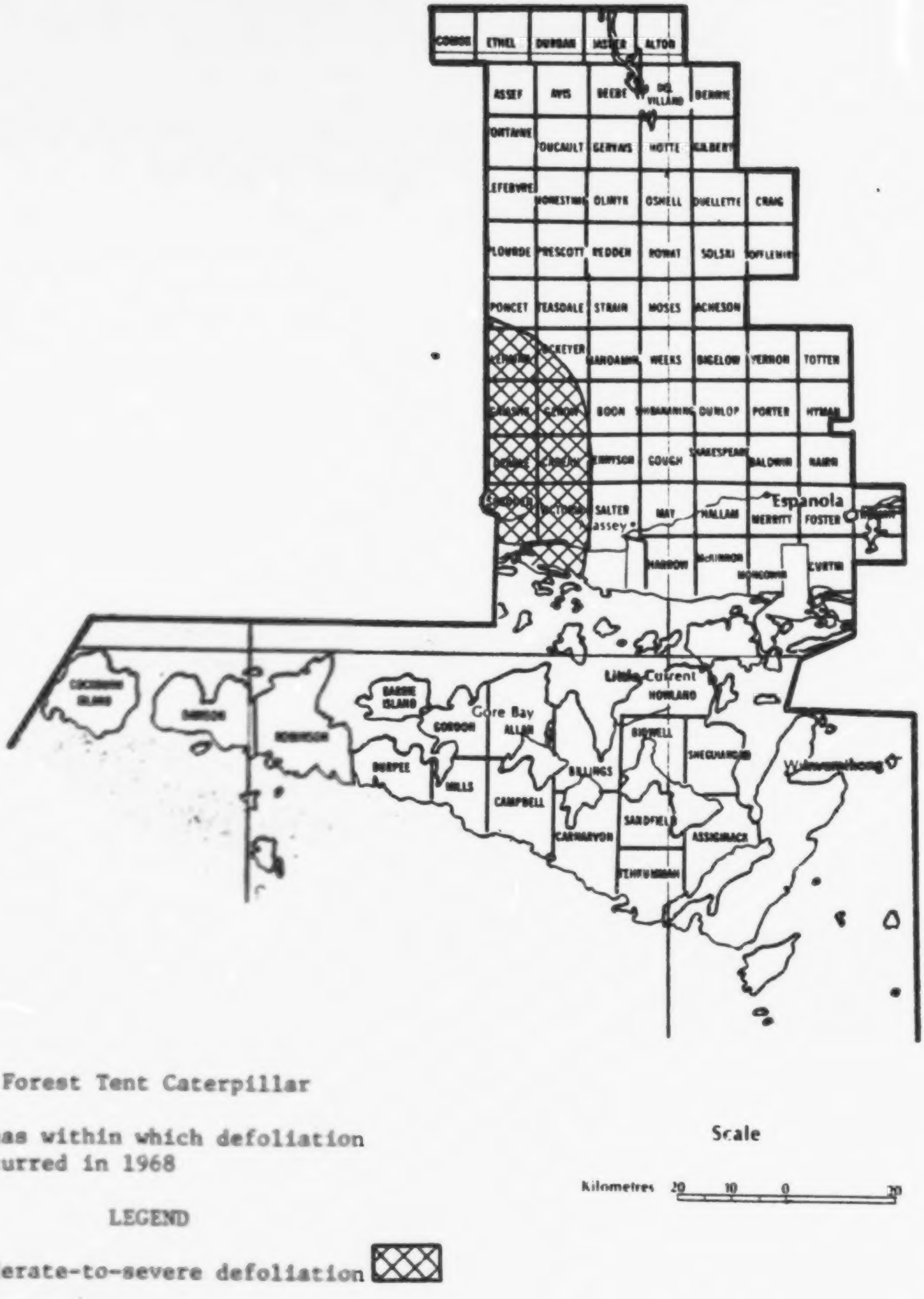
ESPANOLA DISTRICT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ASSIGINACK
TEHKUMMAH
Wikwemikong

Forest Tent Caterpillar

Areas within which defoliation
occurred in 1968

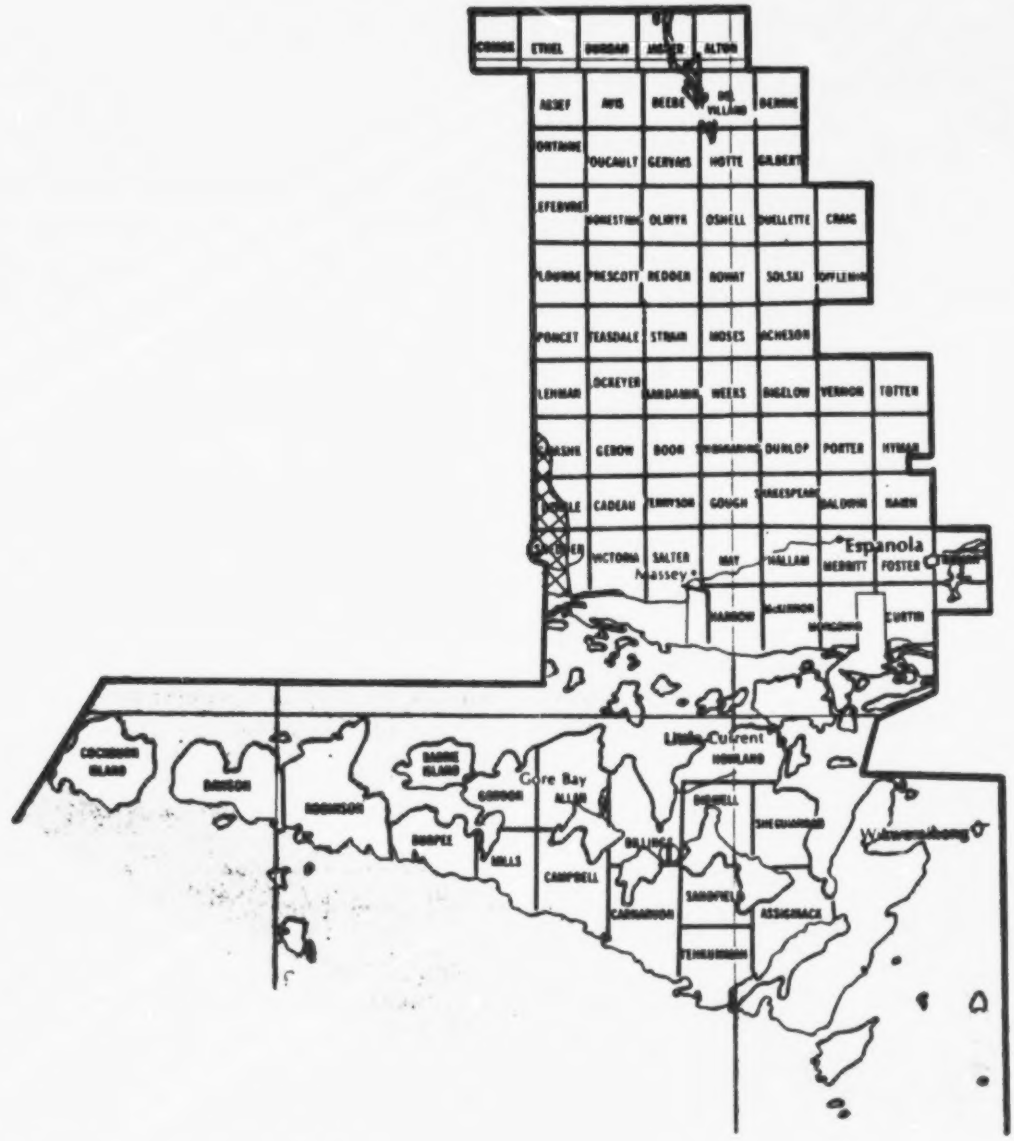
Scale

Kilometres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ▨

ESPANOLA DISTRICT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TEHKUMMAH
Wikwemikong

Forest Tent Caterpillar

Areas within which defoliation occurred in 1969

LEGEND

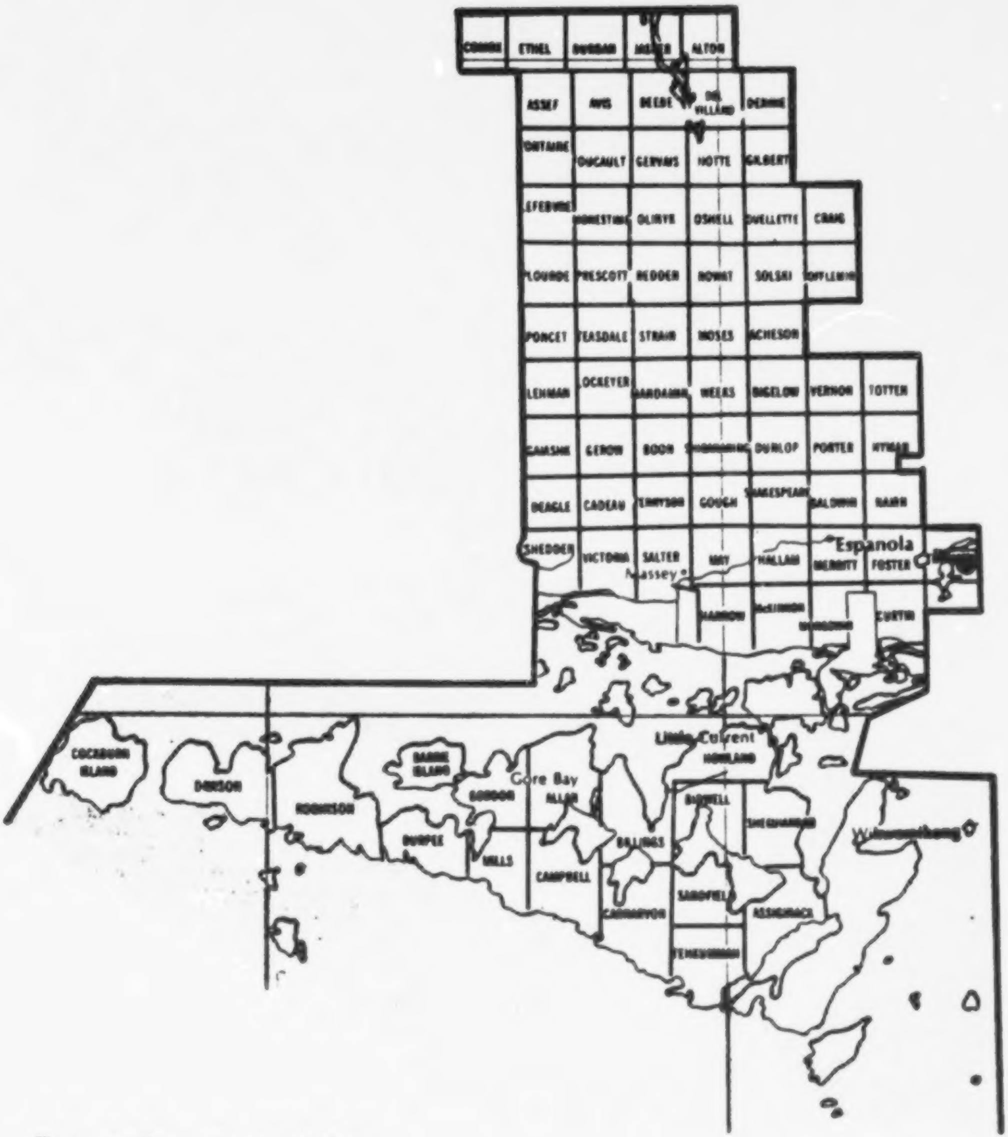
Light defoliation ⓛ

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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CARNARVON
TEHKUMMAH
Wikwemikong

Forest Tent Caterpillar

Areas within which defoliation
occurred in 1974

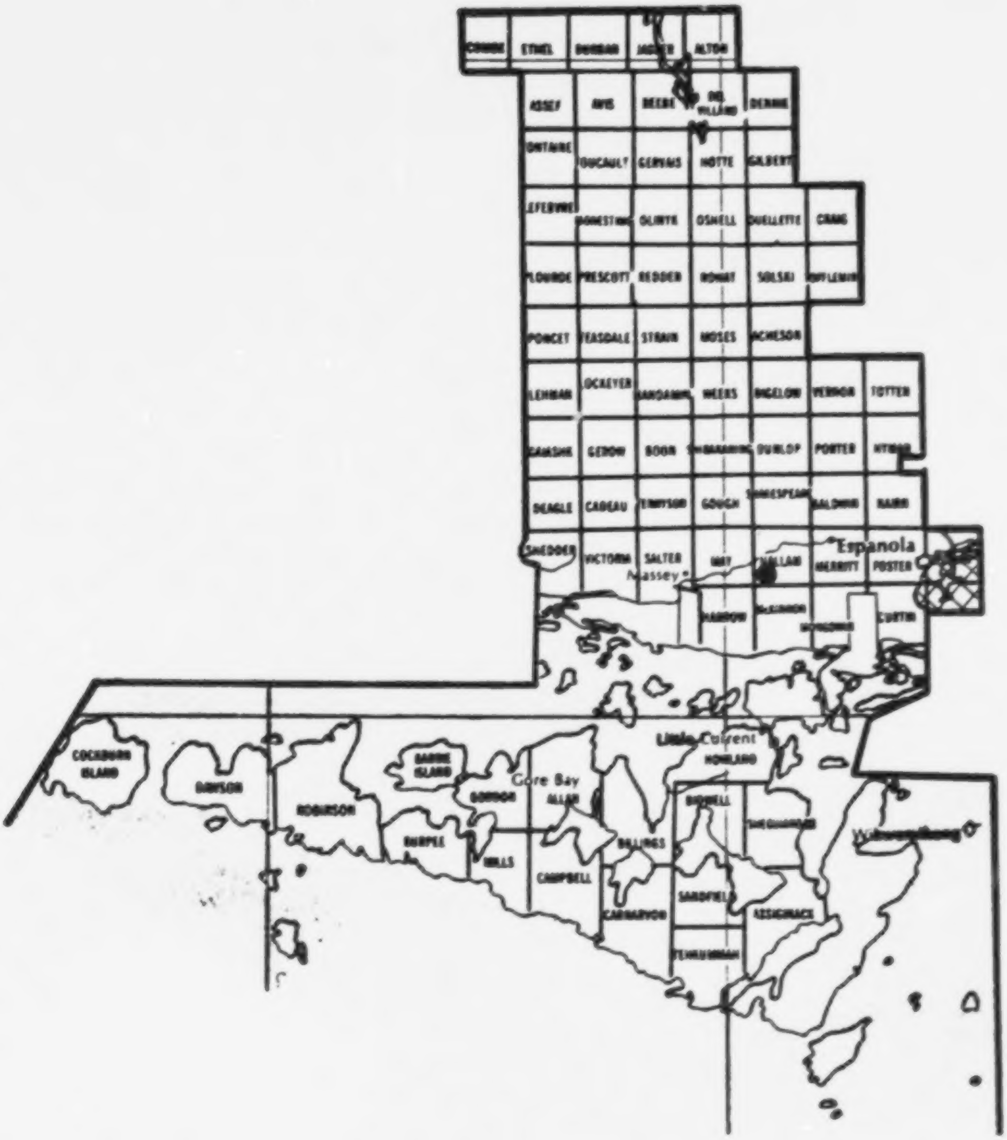
LEGEND

Moderate-to-severe defoliation ●

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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ASSIGINACK
TEHKUMMAH

Forest Tent Caterpillar

Areas within which defoliation occurred in 1975

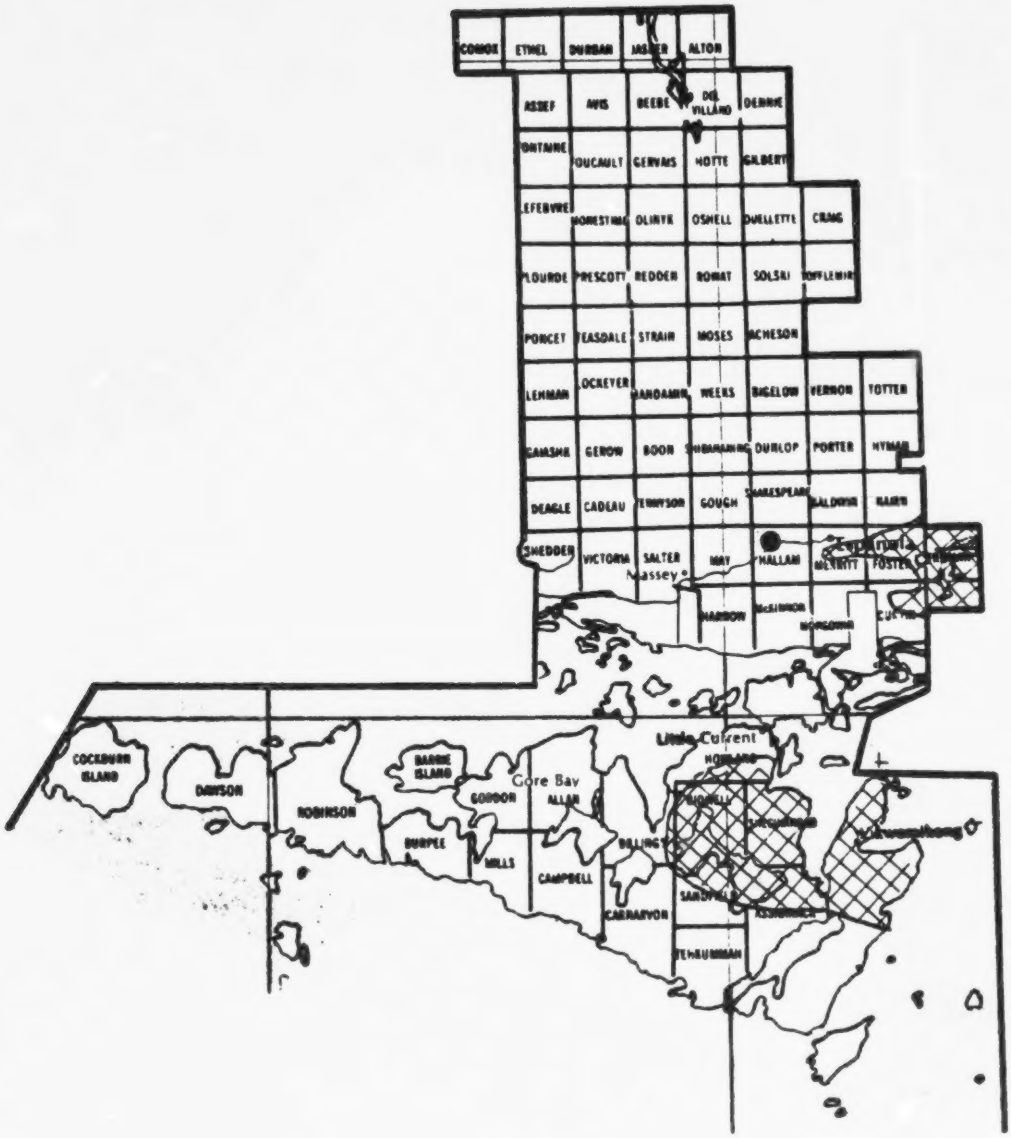
Scale

Kilometres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ● or ▨

ESPANOLA DISTRICT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BILLINGS
CARNARVON
SANDFIELD
TEHKUMMAH

Forest Tent Caterpillar

Areas within which defoliation occurred in 1976

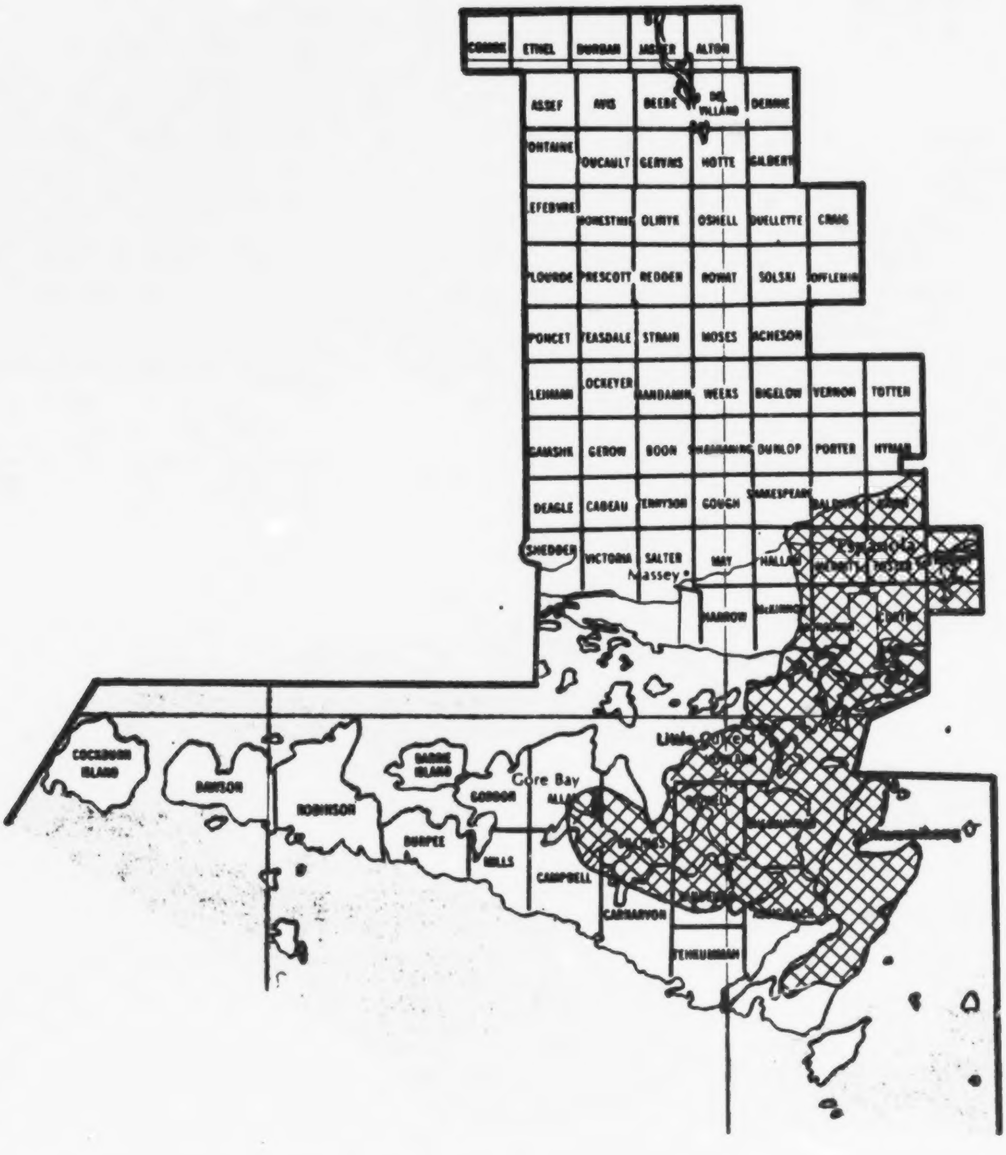
Scale

Kilometres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ● or ▨

ESPANOLA DISTRICT



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CARNARVON
TEHKUMMAH

Forest Tent Caterpillar

Areas within which defoliation occurred in 1977

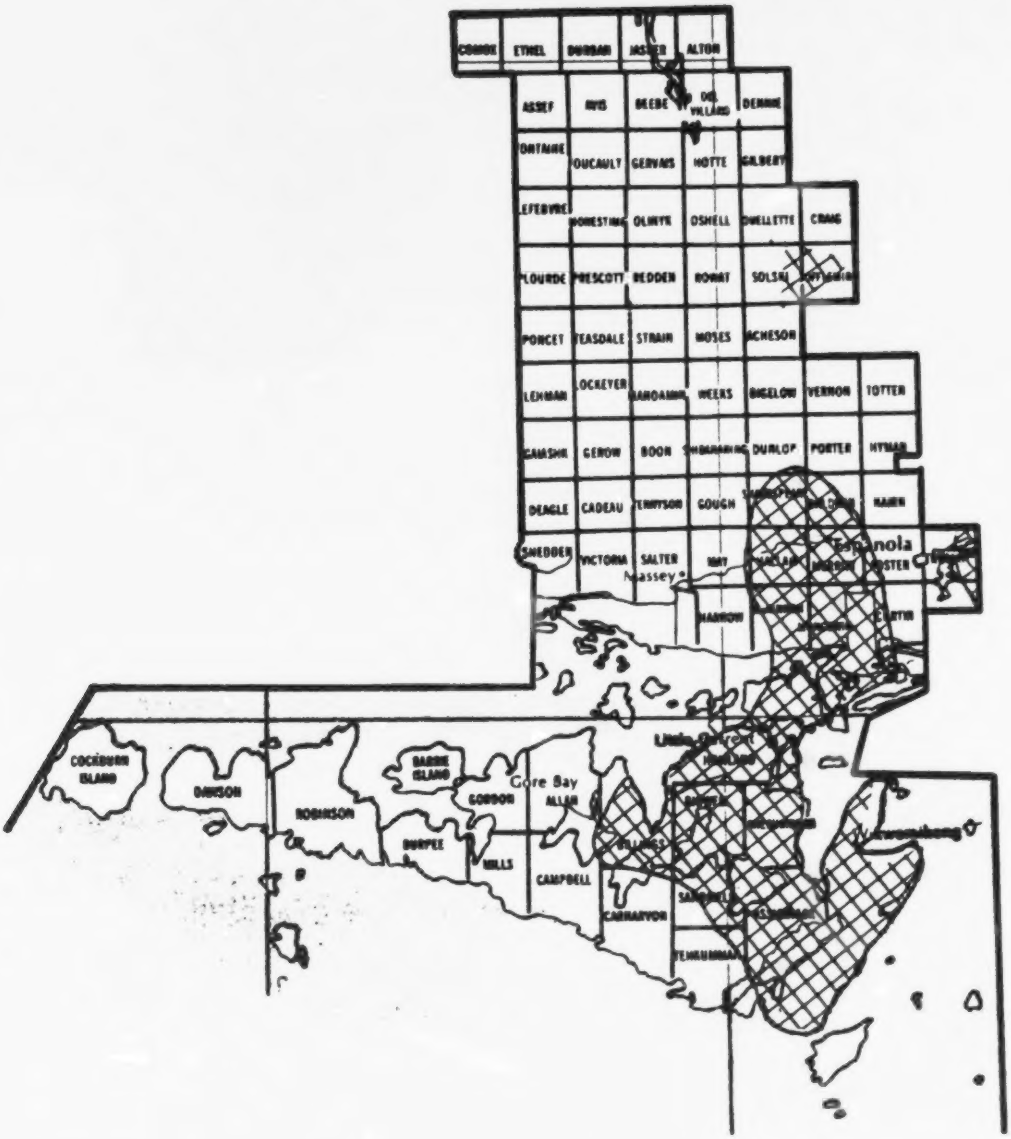
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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Wikwemikong

Forest Tent Caterpillar

Areas within which defoliation occurred in 1978

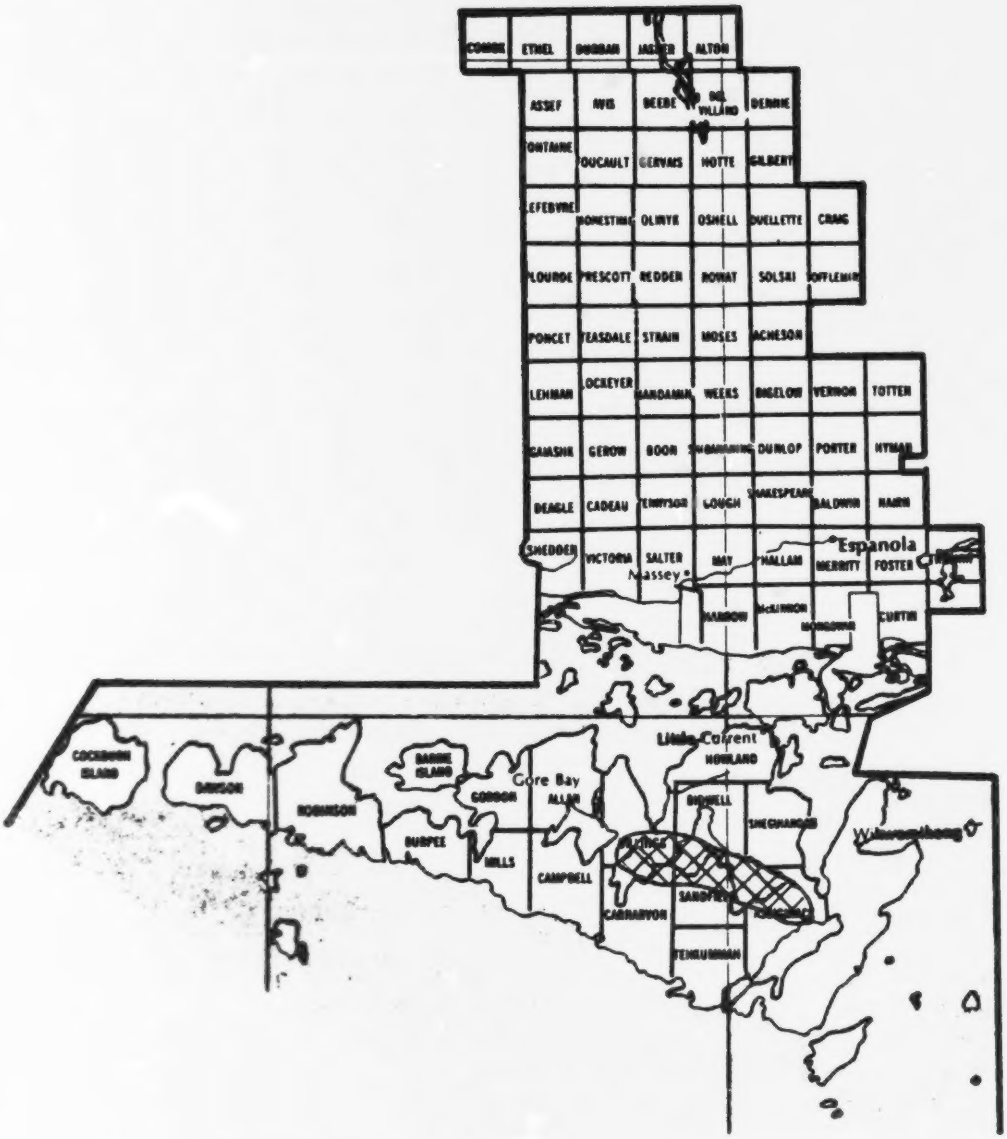
Scale

Kilometres 20 10 0 20

LEGEND

Moderate-to-severe defoliation ▨

ESPANOLA DISTRICT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Wikwemikong

Forest Tent Caterpillar

Areas within which defoliation occurred in 1979

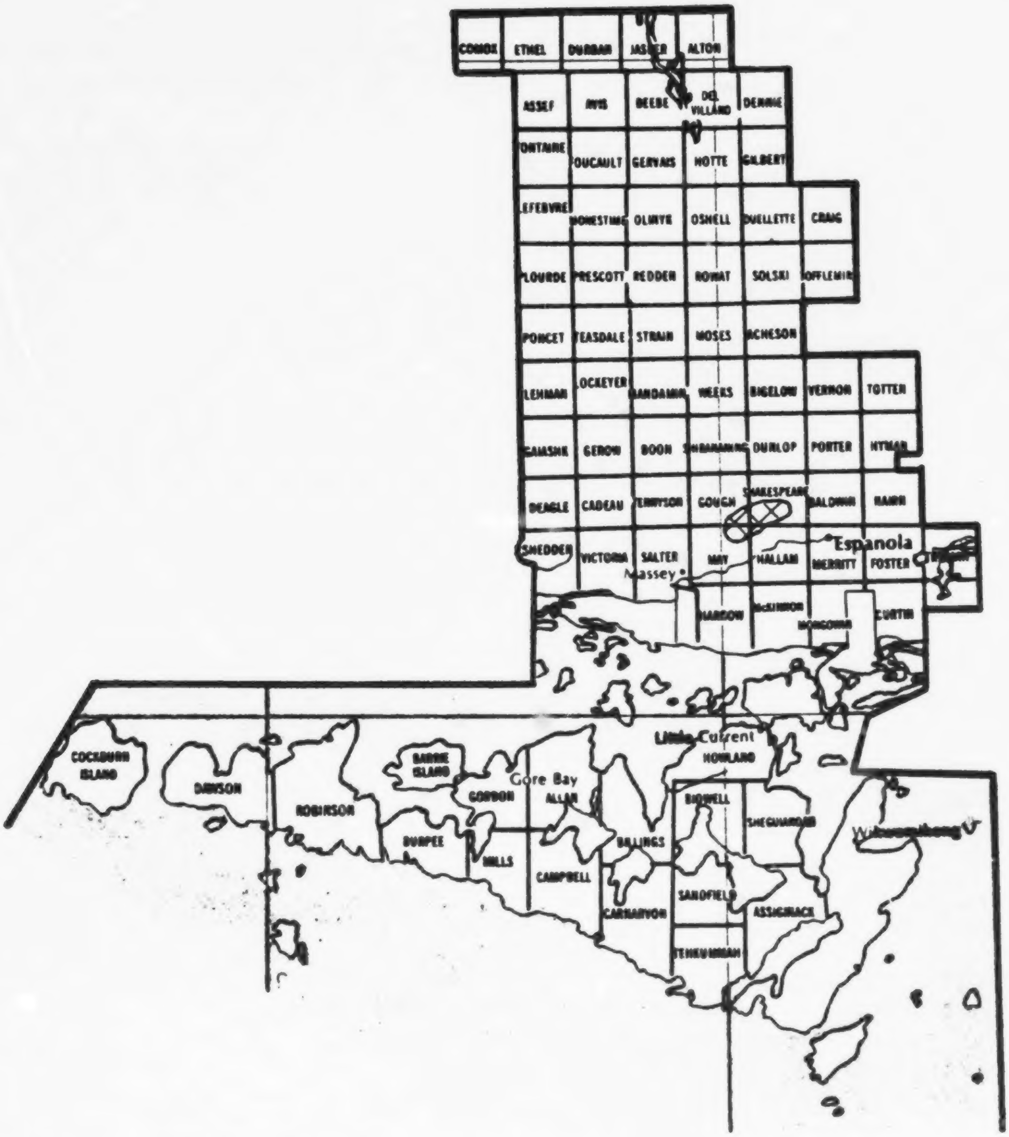
LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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TEHKUMMAH

Forest Tent Caterpillar

Areas within which defoliation occurred in 1980

LEGEND

Moderate-to-severe defoliation ▨

Scale

Kilometres 20 10 0 20

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch)

Host(s): pine [Major]

Year	Remarks
1950-1953	not reported
1954	Light damage was detected in Shedden, Victoria and Nairn twps.
1955	Populations declined to low numbers in the district.
1956	A moderate-to-severe infestation occurred in Hallam Twp and scattered colonies were collected in Shedden Twp.
1957	Moderate-to-severe defoliation was observed on roadside trees in May, Victoria and Tennyson twps. The previous high populations continued in Hallam Twp, where host-tree mortality was detected.
1958	High numbers of infested trees in Tennyson, May, Hallam and Robinson twps and on Cockburn Island.
1959	Populations declined in previous areas of moderate-to-severe defoliation except for one area in May Twp.
1960	Previous high populations declined to low numbers throughout the district.
1961	Only a few colonies were observed in the district.
1962	A light infestation was detected on Cockburn Island and a few colonies were found in Salter Twp.
1963	High populations were observed on roadside trees between Webbwood and Walford. Low populations persisted in Salter Twp.
1964	Previous high populations continued and new areas of moderate-to-severe defoliation were detected on Cockburn Island and on the Spanish River Indian Reserve.
1965	Little change occurred from the previous year. Some mortality was detected.
1966	No changes were recorded.

(cont'd)

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch) (concl.)

Year	Remarks
1967	Moderate-to-severe defoliation was observed in Hallam Twp and high populations persisted on Cockburn Island.
1968	Populations declined in areas of previous moderate-to-severe damage. Scattered colonies were recorded in Gordon, Victoria and Salter twps.
1969-1970	Low numbers were detected in the district.
1971	A moderate-to-severe infestation occurred on Cockburn Island.
1972	The aforementioned infestation declined to light intensity.
1973	The light infestation continued on Cockburn Island and moderate-to-severe defoliation was observed on shelterbelt trees in Salter and Victoria twps.
1974	Light defoliation was observed in a plantation in May Twp and on shelterbelt trees in Victoria Twp.
1975	The infestation in May Twp increased in intensity while population levels in Victoria remained low.
1976	A decrease in population levels in May Twp was accompanied by the presence of tree mortality.
1977	Low populations were again detected in May Twp.
1978	A few colonies were observed in the district.
1979	Light damage was recorded in May Twp.
1980	not reported

European Pine Sawfly, *Neodiprion sertifer* (Geoff.)

Host(s): pine [Major]

Year	Remarks
1950-1964	not reported
1965	Evaluations revealed an average of 40% defoliation in a Scots pine plantation in Dawson Twp and 95% average defoliation in a similar plantation in Carnarvon Twp. This discovery represented the first known distribution record in northern Ontario.
1966	Populations increased in Carnarvon and Dawson twps. New light infestations were detected in Scots pine plantations in Gordon and Sandfield twps. Control with a virus disease was experimented with by the Insect Pathology Research Institute.
1967	A marked decrease in populations occurred in Carnarvon, Dawson, Sandfield and Gordon twps as a result of the experimental spray.
1968	Populations remained low on Manitoulin Island.
1969	Low populations were found in five townships (Dawson, Billings, Gordon, Sandfield and Carnarvon) on Manitoulin Island.
1970	A slight increase was noted at all sample locations on Manitoulin Island except in Sandfield Twp where a slight reduction was noted.
1971	Low populations were again reported.
1972	Populations increased slightly but were still low, except in Billings Twp, where the occasional Scots pine tree experienced moderate-to-severe defoliation.
1973	Colony counts increased slightly on Manitoulin Island. Larvae were found near Providence Bay and on the West Bay Indian Reserve, which represented new distribution points on Manitoulin Island.
1974	Increased populations were observed in seven of eleven Scots pine plantations where evaluations were instituted. A virus spray was utilized in Gordon Twp.

(cont'd)

European Pine Sawfly, *Neodiprion sertifer* (Geoff.) (concl.)

Year	Remarks
1975	Population increases were evident in most sample locations on Manitoulin Island except for the infestation in Gordon Twp where numbers were greatly reduced because of a virus spray.
1976	Substantial decreases occurred in all sample areas on Manitoulin Island except for Carnarvon Twp.
1977	Further decreases in populations on all Scots pine plantations were observed on Manitoulin Island.
1978	Populations declined to very low numbers.
1979-1980	Endemic populations were reported.

Swaine Jack Pine Sawfly, *Neodiprion swainei* Midd.

Host(s): jP [Major]

Year	Remarks
1950-1955	not reported
1956	Single colonies were collected in May Twp.
1957	Single colonies were collected in Robinson Twp.
1958	An average of 3.2 colonies per tree (average tree height of 4.5 m) was recorded in Robinson Twp.
1959	Light infestations were observed at numerous locations in the northern part of the district and scattered colonies were observed in Robinson Twp.
1960	Occasional colonies were found in Robinson Twp.
1961	A light infestation was observed in Robinson Twp.
1962	Very low populations were detected in the district.
1963-1967	not reported
1968	Moderate defoliation was observed on two small islands in Shakwa Lake.
1969	Populations increased on the two previously mentioned islands.
1970	Impact plots established in stands at Shakwa Lake disclosed an average defoliation of 80%.
1971	Average defoliation of the trees examined at Shakwa Lake increased to 90%.
1972-1980	not reported

Pine Sawflies, *Neodiprion nanulus nanulus* Schedl., *N. pratti banksianae* Roh., and *N. virginianus* complex

Host(s): jP,rP [Major]

Year	Remarks
1950	*N. pratti banksianae*: Low numbers were collected in Pancet and Foster twps and on the Birch Island Indian Reserve.
1951	*N. pratti banksianae*: Approximately 260 ha of open-growing trees on Great La Cloche Island suffered moderate-to-severe defoliation.
1952	*N. pratti banksianae*: Moderate-to-severe defoliation was again reported on Great La Cloche Island.
1953	*N. pratti banksianae*: The moderate-to-severe infestation on Great La Cloche Island persisted for the third consecutive year. Scattered colonies were found in Alton, Beebe, Del Villano, Nairn and Salter twps.
1954	*N. pratti banksianae*: The moderate-to-severe infestation on Great La Cloche Island recurred and a light infestation was recorded in Nairn Twp. *N. nanulus nanulus*: Isolated colonies were collected in Shedden Twp. *N. virginianus*: Light infestations were observed in 10 townships in the central part of the district. Moderate-to-severe defoliation of single open-growing trees was recorded in May Twp.
1955	*N. pratti banksianae*: Declining populations resulted in broken pockets of moderate-to-severe defoliation on Great La Cloche Island.
1956	*N. pratti banksianae*: Further reductions in populations resulted in scattered pockets of light-to-moderate defoliation on Great La Cloche Island. *N. virginianus*: Isolated colonies were collected in Hallam Twp.
1957	*N. pratti banksianae*: Scattered colonies were all that remained of the persistent infestation on Great La Cloche Island. Pockets of light defoliation were recorded in Nairn Twp.

(cont'd)

Pine Sawflies, *Neodiprion nanulus nanulus* Schedl., *N. pratti banksianae* Roh., and *N. virginianus* complex (cont'd)

Year	Remarks
1957	*N. virginianus*: A light infestation was recorded in Tehkummah Twp on Manitoulin Island.
1958	*N. pratti banksianae*: A slight increase in populations resulted in areas of light defoliation being recorded on Great La Cloche Island and in Nairn Twp.
	N. nanulus nanulus: Scattered colonies were collected on Great La Cloche Island and in Nairn Twp.
	N. virginianus: Population increases caused severe defoliation on open-growing trees in Hallam and Carnarvon twps.
1959	*N. pratti banksianae*: Light infestations recurred on Great La Cloche Island and in Nairn Twp. Scattered colonies were observed in Foster Twp.
	N. nanulus nanulus: Scattered colonies were recorded in Nairn Twp and on Great La Cloche Island.
	N. virginianus: A previous infestation in Hallam Twp collapsed while trees in Carnarvon Twp continued to suffer severe defoliation.
1960	*N. pratti banksianae*: Light infestations were again recorded on Great La Cloche Island and in Nairn Twp. Scattered colonies were collected in Del Villano and Beebe twps.
	N. nanulus nanulus: Populations and affected areas were the same as in 1959.
	N. virginianus: A group of trees in Carnarvon Twp on Manitoulin Island experienced severe defoliation.
1961	*N. pratti banksianae*: Light infestations recurred for the fourth consecutive year on Great La Cloche Island and in Nairn Twp.
	N. nanulus nanulus: Light defoliation was recorded in Nairn Twp and on Great La Cloche Island.
	N. virginianus: Previous high populations in Carnarvon Twp declined to low numbers.

(cont'd)

Pine Sawflies, *Neodiprion nanulus nanulus* Schedl., *N. pratti banksianae* Roh., and *N. virginianus* complex (cont'd)

Year	Remarks
1962	*N. pratti banksianae*: Population increases caused severe defoliation of fringe trees in the northernmost part of the district. Light infestations persisted in Nairn Twp and on Great La Cloche Island. *N. nanulus nanulus*: An increase in populations on Great La Cloche Island was noted. *N. virginianus*: Low numbers were scattered throughout the district.
1963	*N. pratti banksianae*: A slight decrease in defoliation intensity was recorded on fringe trees in the northern part of the district in the Mozhabong Lake area. *N. nanulus nanulus*: Increase populations were responsible for causing light defoliation in Nairn, Teasdale, Monestime, Prescott and Del Villano twps and on Great La Cloche Island. *N. virginianus*: Low numbers were collected throughout the district and a light infestation was reported in Burpee Twp.
1964	*N. pratti banksianae*: Fringe trees around Mozhabong Lake experienced a further decrease in defoliation but pockets of moderate-to-severe damage persisted in Oshell, Gilbert and Ouellette twps. Light infestations persisted in Nairn Twp and on Great La Cloche Island. *N. nanulus nanulus*: Moderate-to-severe defoliation was recorded on roadside trees in the northern townships. Light infestations recurred in Nairn and Del Villano twps. *N. virginianus*: Increased populations resulted in moderate-to-severe defoliation in Burpee Twp.
1965	*N. pratti banksianae*: Severe defoliation occurred on fringe trees in the Mozhabong Lake area. *N. nanulus nanulus*: Populations increased in the district and light infestations continued to affect trees in Nairn Twp and on Great La Cloche Island.

(cont'd)

Pine Sawflies, *Neodiprion nanulus nanulus* Schedl., *N. pratti banksianae* Roh., and *N. virginianus* complex (cont'd)

Year	Remarks
1965	*N. virginianus*: Severe defoliation was recorded on Burnt Island and again in Burpee Twp.
1966	*N. pratti banksianae*: Pockets of moderate-to-severe defoliation were recorded in Oshell and Hotte twps and in the Mozhabong Lake area.
	N. nanulus nanulus: Light defoliation was recorded in Del Villano, Beebe and Nairn twps.
	N. virginianus: Moderate-to-severe defoliation was detected in Burpee and Hallam twps.
1967	*N. pratti banksianae*: Trees in the Mozhabong Lake area again experienced high populations.
	N. nanulus nanulus: Low numbers were collected in the district.
	N. virginianus: Previous high populations subsided in Burpee Twp but remained high in Hallam Twp.
1968	*N. pratti banksianae*: Scattered colonies were collected in the district.
	N. nanulus nanulus: Populations declined to low numbers.
	N. virginianus: Low numbers were observed at numerous locations.
1969	*N. pratti banksianae*: Except for high populations on a small group of trees in Oshell Twp, low numbers were recorded throughout the district.
	N. virginianus: Low populations were reported throughout the district.
1970	*N. pratti banksianae*: Low numbers were collected in the district.
	N. virginianus: Low levels were detected in the district.

(cont'd)

Pine Sawflies, *Neodiprion nanulus nanulus* Schedl., *N. pratti banksianae* Roh., and *N. virginianus* complex (concl.)

Year	Remarks
1971	*N. pratti banksianae*: A few colonies were collected in Nairn Twp.
1972	*N. nanulus nanulus*: Occasional colonies were detected in the district.
1973	*N. pratti banksianae*: A few colonies were collected in Merritt Twp.
1974	*N. virginianus*: Moderate defoliation was recorded in Burpee, Carnarvon and Robinson twps on Manitoulin Island. Light-to-moderate damage was also reported in Hallam Twp.
1975	*N. virginianus*: Severe defoliation was recorded in Robinson Twp and areas of light-to-moderate damage were reported in Burpee, Carnarvon and Hallam twps.
1976	*N. virginianus*: The previous high populations in Robinson Twp declined to low numbers.
1977	*N. pratti banksianae*: Low numbers were detected in the district.
1978-1980	not reported

Aspen Leafblotch Miner, *Phyllonorycter ontario* (Free.)

Host(s): aspen [Major]

Year	Remarks
1950	not reported
1951	Moderate-to-severe leafmining was recorded in the northern part of the district.
1952-1953	High populations throughout the entire district were responsible for severe leafmining.
1954	Severe mining was detected in Hallam and Gough twps.
1955-1957	not reported
1958	Very low numbers were detected in the district.
1959	High populations were observed on aspen regeneration in Monestime Twp.
1960	Light damage was noted at several locations in the district.
1961	Sharp population increases were recorded along the northern part of the Massey Tote Road.
1962	Severe leafmining occurred throughout the northern part of the district.
1963	Damage was still high in the northern parts of the district but light infestations were more numerous in the south.
1964	The situation remained unchanged from the previous year.
1965	Population declines resulted in broken pockets of moderate-to-severe damage in the northern part of the district.
1966-1967	Only very low numbers were found in the district.
1968-1970	not reported
1971	Light infestations were observed in Weeks Twp.
1972-1974	Low populations were found commonly in the district.

(cont'd)

Aspen Leafblotch Miner, *Phyllonorycter ontario* (Free.) (concl.)

Year	Remarks
1975	A high incidence of leafmining was observed in Nairn Twp.
1976	Populations were found at endemic levels.
1977	Light damage was recorded on trees in Merritt and Curtin twps.
1978-1980	not reported

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.)

Host(s): wS,bS [Major]

Year	Remarks
1950	not reported
1951	Light-to-moderate damage was reported throughout the entire district.
1952	Light infestations were detected throughout the district with accompanying areas of severe defoliation in Harrow, Beebe, Jasper and Alton twps.
1953-1954	Low populations were observed in the district.
1955	not recorded
1956	An area of severe defoliation was recorded in Del Villano Twp.
1957	Areas of severe defoliation were observed in Hallam, Del Villano, Beebe and Avis twps and on Great La Cloche Island.
1958	Moderate-to-severe infestations were detected in Merritt, Hallam and Sheguiandah twps.
1959	Moderate-to-severe defoliation recurred in Merritt, Hallam and Sheguiandah twps. Population increases were noted on the eastern portion of Manitoulin Island.
1960	found commonly throughout the district with moderate-to-severe damage recurring in Hallam and Merritt twps
1961	Small trees on Great La Cloche Island were heavily infested.
1962	Moderate-to-severe infestations persisted in Merritt and Foster twps. High numbers were observed in Burpee Twp.
1963	A light infestation was recorded in a plantation in Merritt Twp.
1964	Increased populations caused moderate-to-severe defoliation in Merritt Twp, at the west end of Manitoulin Island, and on Cockburn Island.

(cont'd)

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.) (concl.)

Year	Remarks
1965	Moderate-to-severe damage was noted in plantations in Merritt and Burpee twps.
1966	Populations and locations of damage were similar to those of the previous year.
1967	A moderate-to-severe infestation was reported in Hallam Twp. Light-to-moderate damage occurred throughout the rest of the district.
1968	Low populations were observed in the district.
1969	not reported
1970	A plantation in Foster Twp suffered moderate-to-severe defoliation.
1971-1973	not reported
1974	Moderate-to-severe damage was recorded in Foster Twp and in the town of Espanola.
1975	not reported
1976	Trees in Merritt and Foster twps and in the town of Espanola experienced moderate-to-severe defoliation.
1977	Moderate-to-severe damage occurred on trees in Baldwin and Merritt twps.
1978	Low populations were observed throughout the district.
1979	Light-to-moderate damage was observed in Merritt Twp.
1980	Low populations were observed throughout the district.

White Pine Weevil, *Pissodes strobi* (Peck)

Host(s): pine, spruce [Major]

Year	Remarks
1950-1951	not reported
1952	Leader damage was observed in Merritt, Nairn and Mandamin twps.
1953	Severe damage occurred on open-growing trees in Nairn and Shedden twps.
1954	High numbers continued to infest a white pine plantation in Nairn Twp where 33% of the trees were attacked.
1955	Population increases in the Nairn Twp plantation caused 73% of the trees examined to be damaged.
1956	Damage in the Nairn Twp plantation continued to reflect high numbers.
1957	Severe leader damage recurred in Nairn Twp. Light shoot damage was detected in Shedden and Mandamin twps.
1958	High populations continued to infest the plantation in Nairn Twp. Light infestations occurred in jack pine plantations in Merritt and Shakespeare twps.
1959	Populations and locations of damage were similar to those of the previous year.
1960	Counts of weeviled trees showed that fewer trees were weeviled than in 1959.
1961	Except for Nairn Twp where severe damage was again recorded, populations remained low.
1962	Populations persisted at low levels except for the white pine plantations in Nairn Twp, where high populations recurred.
1963-1967	not reported
1968	High populations were detected in Hallam and Baldwin twps where 32% and 38%, respectively, of the trees were affected.
1969	Severe damage was recorded in Foster and Baldwin twps where 24% and 29%, respectively, of the trees were affected.

(cont'd)

White Pine Weevil, *Pissodes strobi* (Peck) (concl.)

Year	Remarks
1970	Foster and Baldwin twps again experienced severe weevil damage. Damage counts in four other townships ranged from 4% to 12%.
1971	Foster and Baldwin twps continued to have the highest percentage of trees weeviled, the one in a Scots pine plantation, the other in a white pine plantation.
1972	Foster and Baldwin twps again hosted high populations and a plantation (white pine) in Merritt Twp had 26% of the trees weeviled. Damage at four other locations averaged 2%.
1973	Population levels remained high in Foster Twp. Damage at six other locations averaged 10%.
1974	Counts of 26%, 29% and 30% were recorded in Foster, Merritt and Victoria twps, respectively. Counts in three other townships averaged 6%.
1975	The percentage of trees weeviled in a Scots pine plantation, a jack pine plantation and four white pine plantations was 22%. This included a count of 48% in Merritt Twp.
1976	The percentage of white pine weeviled in Foster, Merritt and Victoria twps averaged 42%.
1977	Forty-six percent of the trees in Merritt Twp, 44% in Foster Twp and 38% in Oshell Twp had leader damage. Damage averaged 25% at seven locations.
1978	Populations declined slightly in the Espanola District. Damage was still severe.
1979	A count of 49% trees affected was made in Foster Twp.
1980	In Merritt Twp, 75% of the trees examined were affected. Overall leader damage in five plantations was 26%.

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

Host(s): tL [Major]

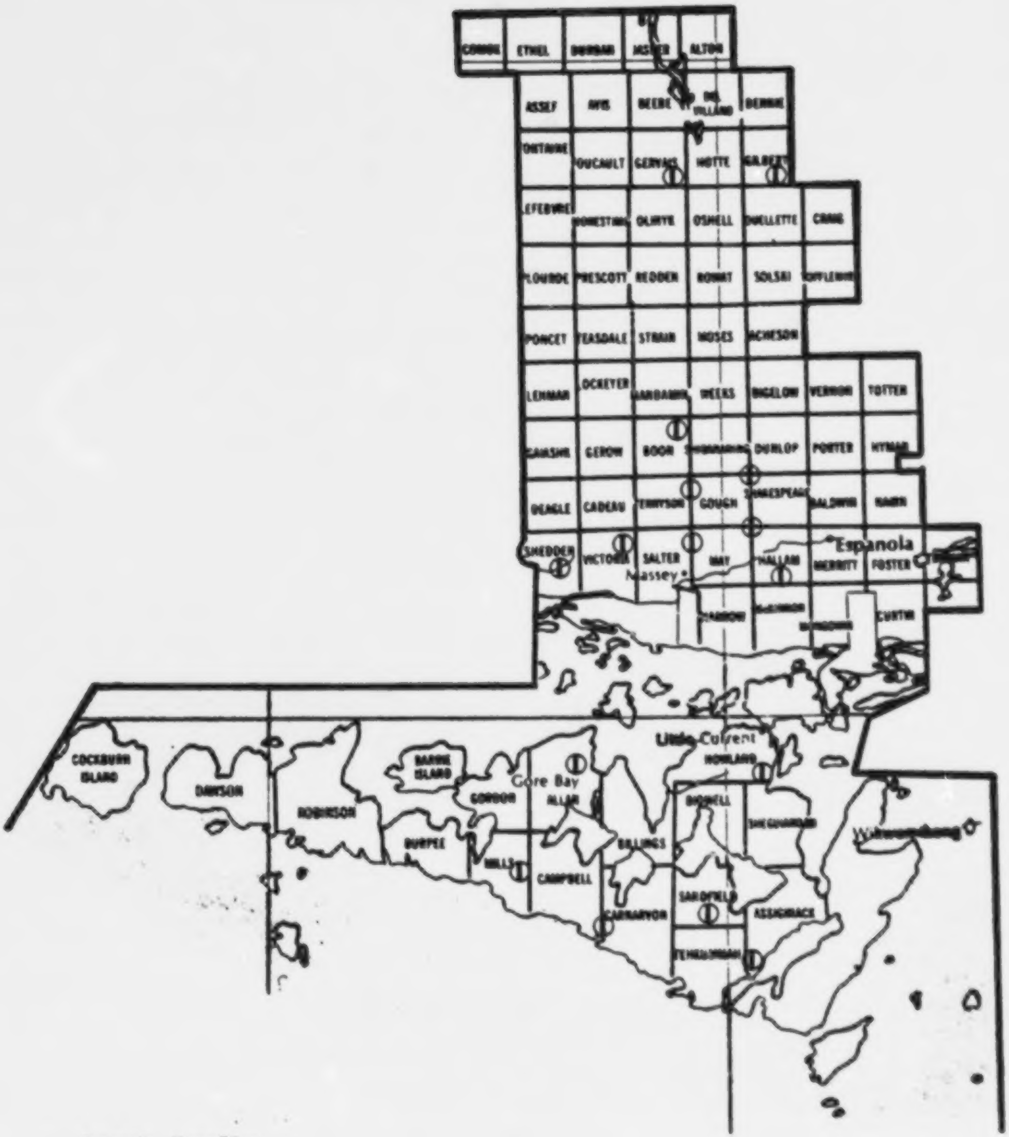
Year	Remarks
1950-1953	not reported
1954	Light infestations were detected in larch stands throughout the district (see map, page 90).
1955	Scattered colonies were collected throughout the district (see map, page 91).
1956	Moderate-to-severe damage was observed in the central part of the district and on Manitoulin Island. Elsewhere light populations were recorded (see map, page 92).
1957	Light and moderate-to-severe defoliation was detected at several locations in the district (see map, page 93).
1958	An increase in the number of pockets of moderate-to-severe defoliation was observed on Manitoulin and Cockburn islands. Elsewhere in the district defoliation was light (see map, page 94).
1959	There was very little change from the previous year (see map, page 95).
1960	A decline in populations and associated damage was evident in the district (see map, page 96).
1961	Populations continued to decline except in Ouellette and Carnarvon twps, where moderate-to-severe defoliation occurred (see map, page 97).
1962	A moderate-to-severe infestation recurred in Carnarvon Twp. Moderate-to-severe damage also occurred on the Spanish River Indian Reserve. Elsewhere in the district populations were light.
1963	Moderate-to-severe damage recurred in the Spanish River Indian Reserve. Light defoliation was observed at scattered sample points.
1964	The damage situation was unchanged from the previous year.

(cont'd)

Larch Sawfly, *Pristiphora erichsonii* (Htg.) (concl.)

Year	Remarks
1965	The moderate-to-severe infestation persisted on the Spanish River Indian Reserve and similar damage was observed in Rowat Twp.
1966	The previous moderate-to-severe infestation on the Spanish River Indian Reserve declined to light intensity.
1967	Low numbers were detected throughout the district.
1968	Moderate-to-severe infestations in small stands of larch in Baldwin, May and Salter twps reflected population increases in the district.
1969	The situation remained unchanged from the previous year.
1970-1971	Moderate-to-severe defoliation was observed in Hallam and Baldwin twps.
1972	Areas in Hallam, Baldwin and Victoria twps and on Cockburn Island suffered moderate-to-severe infestations.
1973	Previous high populations declined to low levels.
1974	A small pocket of moderate-to-severe defoliation occurred in Victoria Twp.
1975	Moderate-to-severe defoliation was observed in several stands between the towns of Massey and Spanish.
1976	Previous areas of moderate-to-severe defoliation declined to light intensity except for an area in May Twp.
1977	Moderate-to-severe defoliation continued in May Twp.
1978-1980	Populations declined to low numbers.

ESPANOLA DISTRICT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LOCKEYER
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TOTTEN
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HYMAN
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TENNYSON
GOUGH
SHAKESPEARE
BALDWIN
NAIRN
SHEDDEN
VICTORIA
SALTER
MAY
HALLAM
MERRITT
FOSTER
Espanola
Massey
CURTIN
COCKBURN ISLAND
DAWSON
ROBINSON
BARRIE ISLAND
GORDON
ALLAN
Gore Bay
Little Current
HOWLAND
BIDWELL
SHEGUIANDAH
BURPEE
MILLS
CAMPBELL
BILLINGS
CARNARVON
SANDFIELD
ASSIGINACK
TEHKUMMAH
Wikwemikong

Larch Sawfly

Areas within which defoliation occurred in 1954

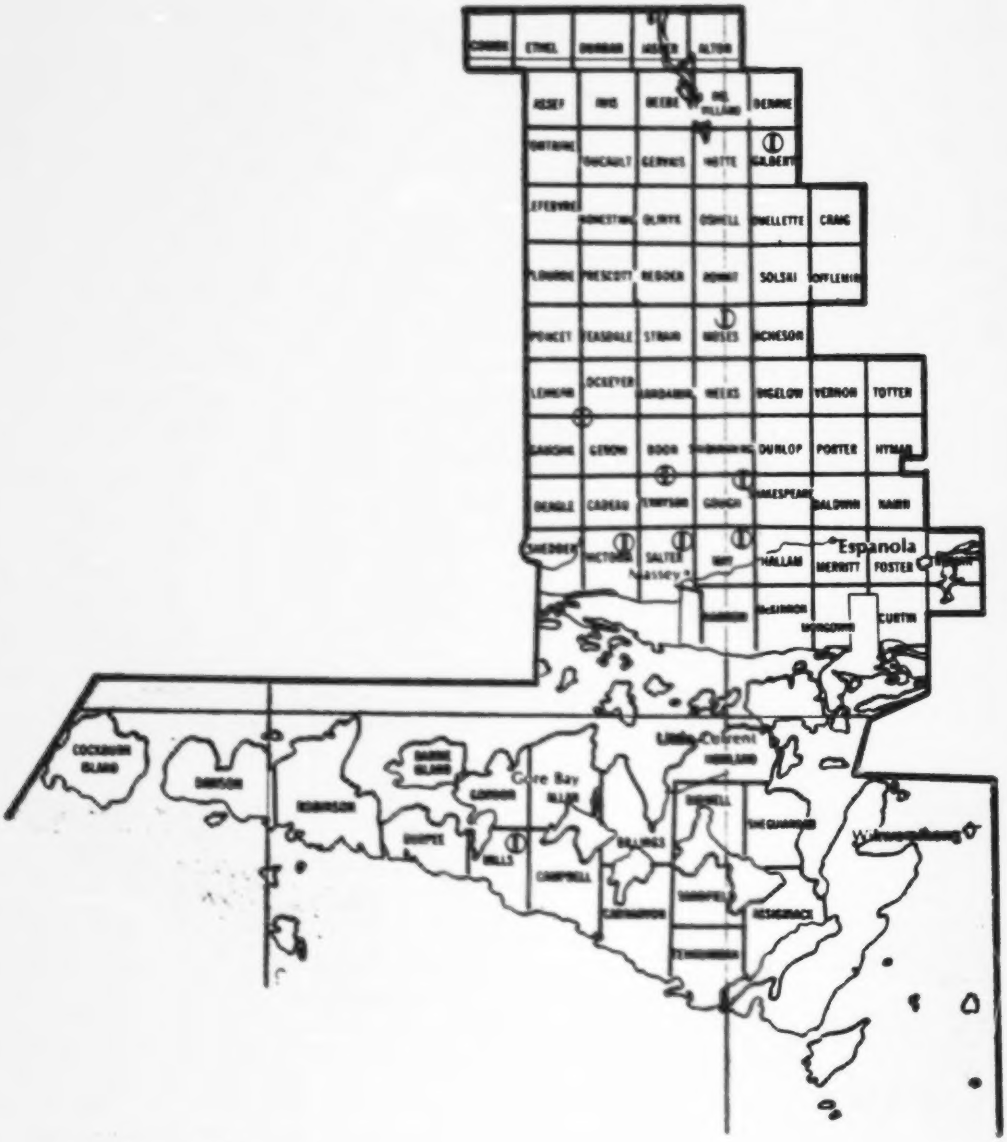
LEGEND

Light defoliation ⦶

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT


Espanola
Little Current
Gore Bay
Massey

Larch Sawfly

Areas within which defoliation occurred in 1955

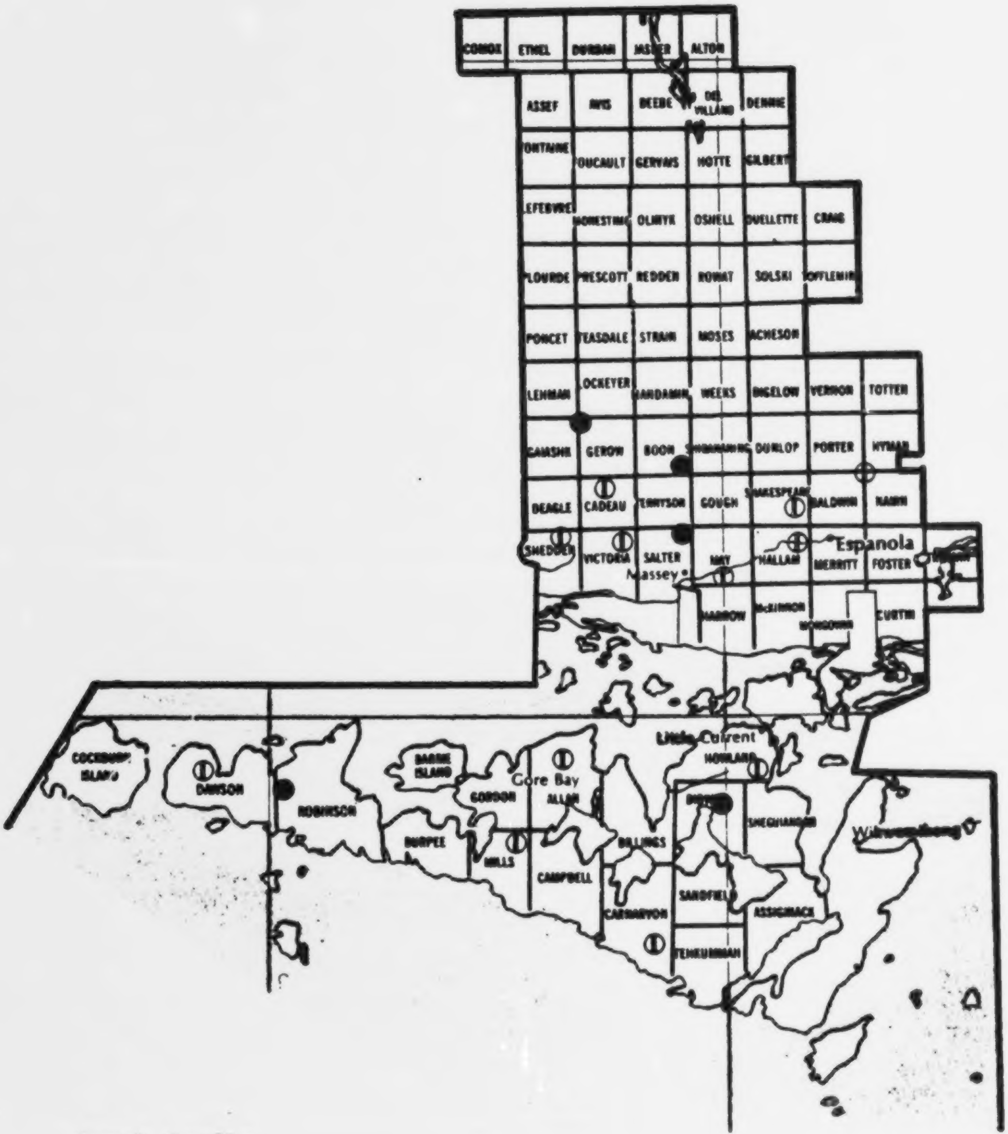
LEGEND

Light defoliation Ⓛ

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT



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BURPEE
MILLS
CAMPBELL
BILLINGS
SHEGUIANDAH
CARNARVON
SANDFIELD
ASSIGINACK
TEHKUMMAH
Wikwemikong

Larch Sawfly

Areas within which defoliation occurred in 1956

Scale

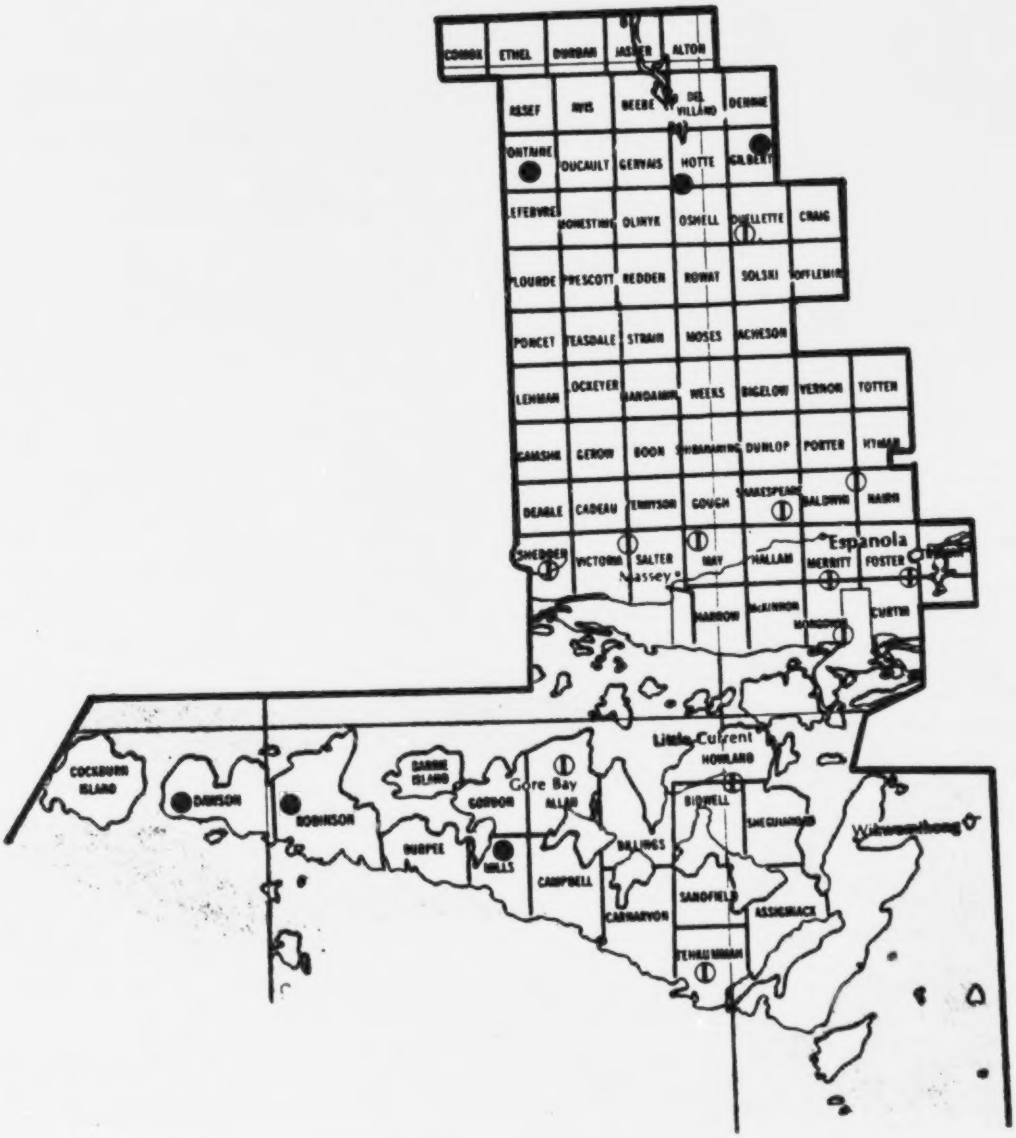
Kilometres 20 10 0 20

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ●

ESPANOLA DISTRICT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MILLS
CAMPBELL
BILLINGS
BIDWELL
SHEGUIANDAH
SANDFIELD
ASSIGINACK
CARNARVON
TEHKUMMAH

Larch Sawfly

Areas within which defoliation occurred in 1957

LEGEND

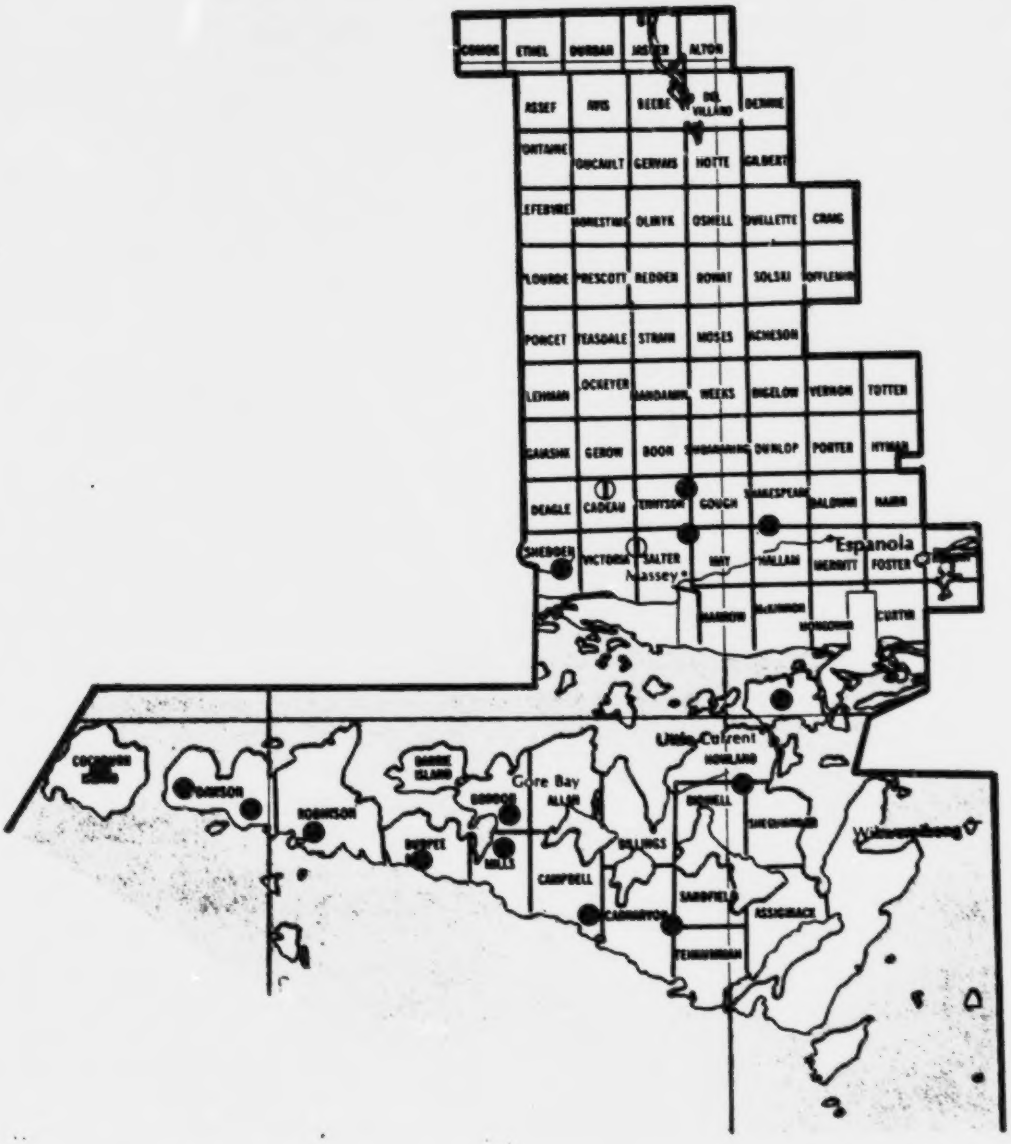
Light defoliation ⦶

Moderate-to-severe defoliation ●

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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BILLINGS
CAMPBELL
MILLS
CARNARVON
SANDFIELD
ASSIGINACK
TEHKUMMAH

Larch Sawfly

Areas within which defoliation occurred in 1958

LEGEND

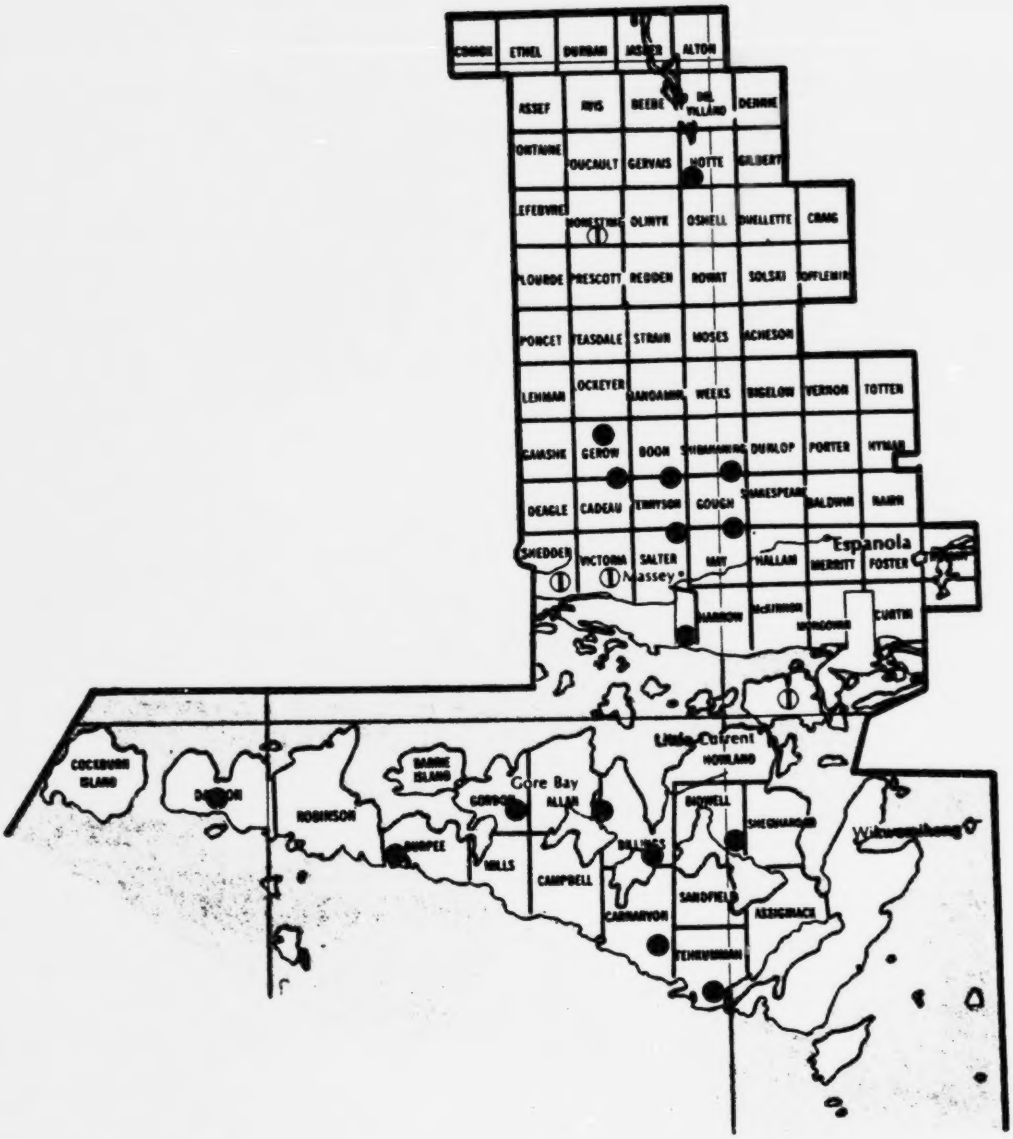
Light defoliation ⦶

Moderate-to-severe defoliation ●

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT


Espanola
Massey
Little Current
Gore Bay
Wikwemikong

Larch Sawfly

Areas within which defoliation occurred in 1959

LEGEND

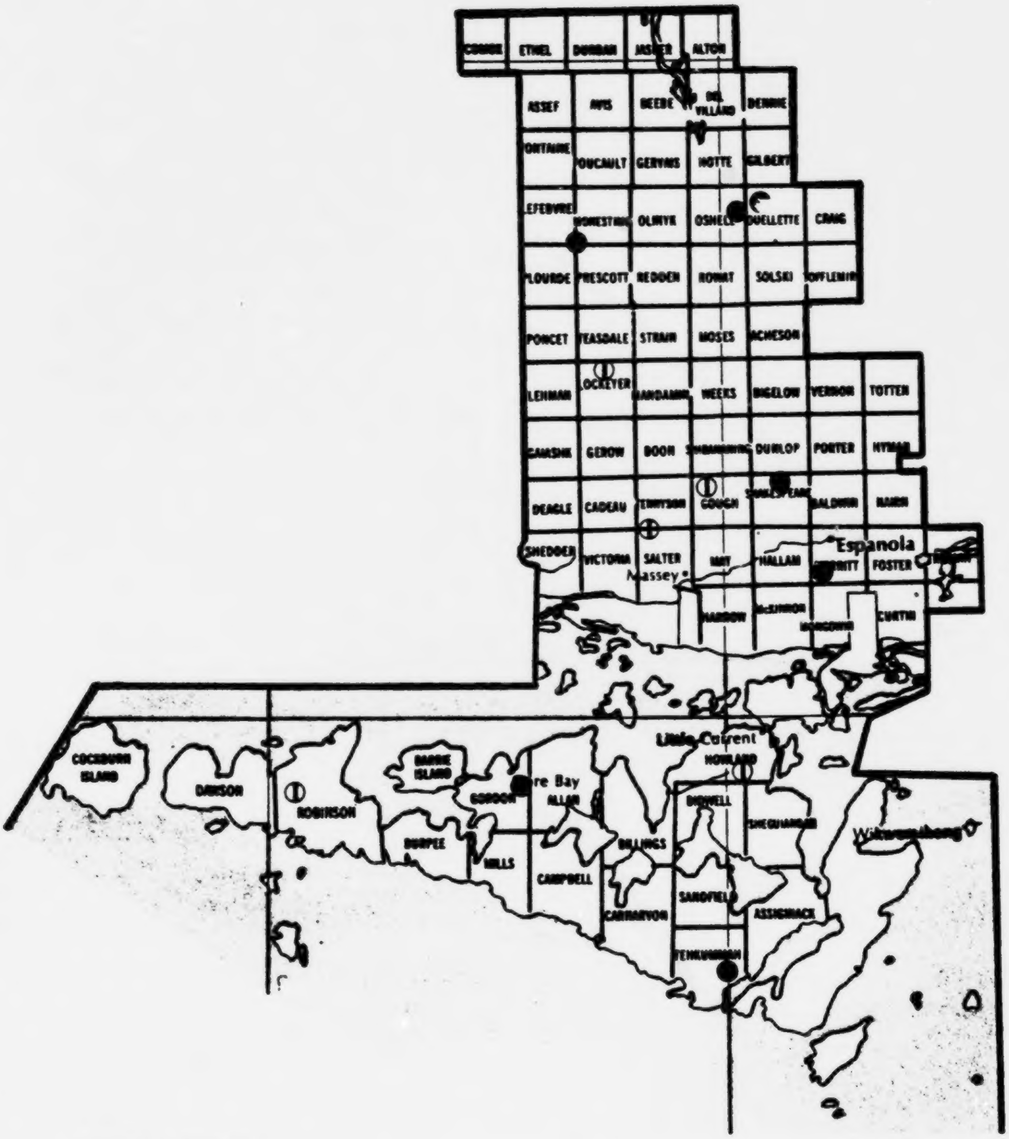
Light defoliation ◐

Moderate-to-severe defoliation ●

Scale

Kilometres 20 10 0 20

ESPANOLA DISTRICT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CADEAU
TENNYSON
GOUGH
SHAKESPEARE
BALDWIN
NAIRN
SHEDDEN
VICTORIA
SALTER
HALLAM
FOSTER
Espanola
Massey
CURTIN
COCKBURN ISLAND
DAWSON
ROBINSON
BARRIE ISLAND
GORDON
ALLAN
Little Current
HOWLAND
BIDWELL
SHEGUIANDAH
BURPEE
MILLS
CAMPBELL
BILLINGS
CARNARVON
SANDFIELD
ASSIGINACK
TEHKUMMAH
Wikwemikong

Larch Sawfly

Areas within which defoliation occurred in 1960

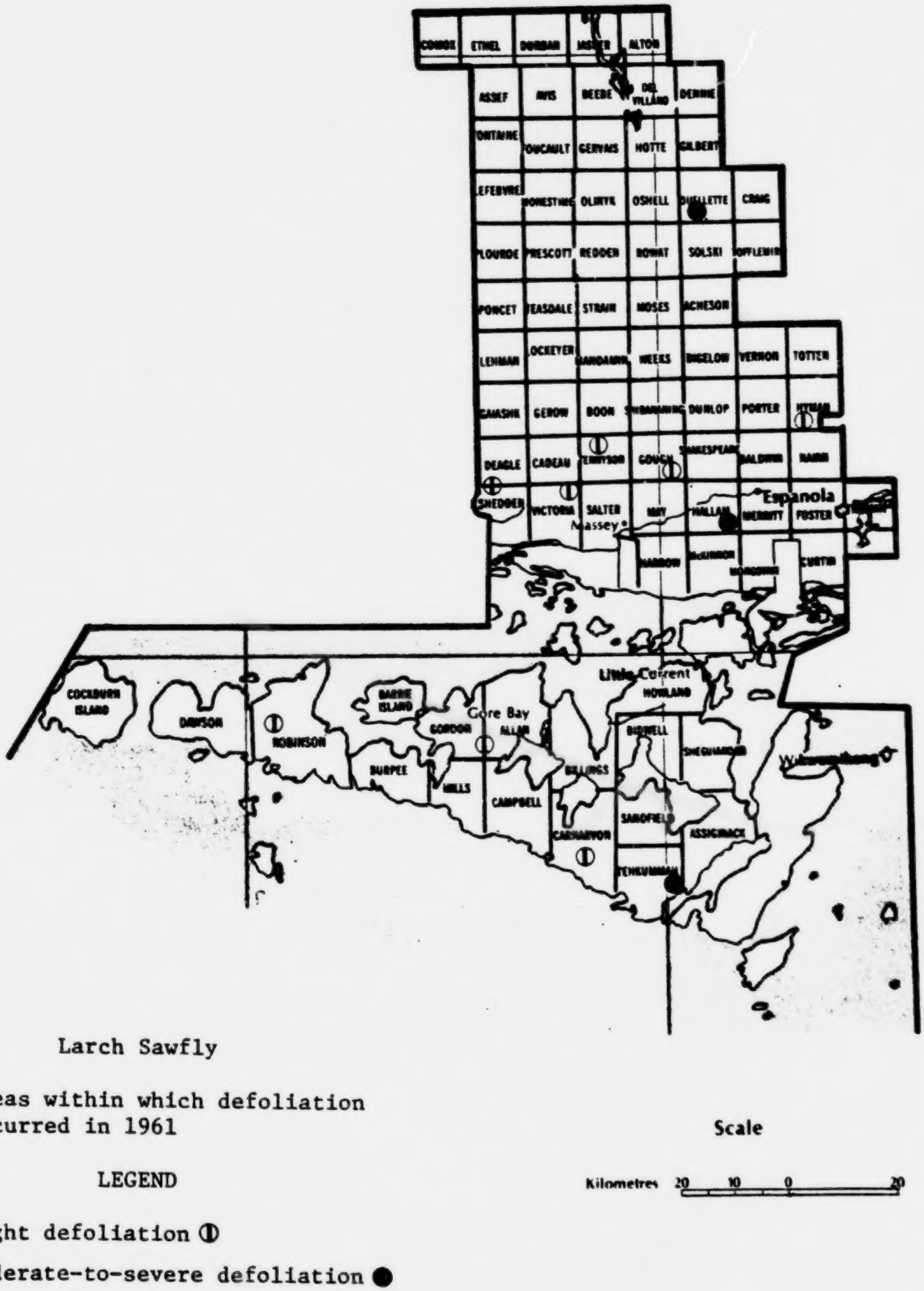
LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ●

Scale
Kilometres 20 10 0 20

ESPANOLA DISTRICT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GILBERT
LEFEBVRE
HONESTING
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OSHELL
OUELLETTE
CRAIG
PLOURDE
PRESCOTT
REDDEN
ROWAT
SOLSKI
TOFFLEMIRE
PONCET
TEASDALE
STRAIN
MOSES
ACHESON
LEHMAN
LOCKEYER
WEEKS
BIGELOW
VERNON
TOTTEN
GAMASHK
GEROW
BOON
DUNLOP
PORTER
HYMAN
DEAGLE
CADEAU
TENNYSON
GOUGH
SHAKESPEARE
BALDWIN
NAIRN
SHEDDEN
VICTORIA
SALTER
MAY
HALLAM
MERRITT
FOSTER
Espanola
Massey
MCKINNON
CURTIN
Little Current
HOWLAND
COCKBURN ISLAND
DAWSON
ROBINSON
BARRIE ISLAND
GORDON
Gore Bay
ALLAN
BIDWELL
SHEGUIANDAH
BURPEE
MILLS
CAMPBELL
BILLINGS
SANDFIELD
ASSIGINACK
CARNARVON
TEHKUMMAH

Larch Sawfly

Areas within which defoliation occurred in 1961

Scale

Kilometres 20 10 0 20

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ●

Other Noteworthy Insects

Eastern Blackheaded Budworm, *Acleris variana* (Fern)

Host(s): spruce, bF [Major]

Year	Remarks
1950-1952	not reported
1953	low numbers collected in Carnarvon, Tehkummah and Mills twps
1954	not reported
1955	light infestations recorded in Salter Twp
1956-1958	not reported
1959	light infestations along roads between Weeks and Oshell twps and low numbers collected in Comox and Jasper twps
1960	a light infestation recorded in Mongowin Twp
1961	Defoliation in Mongowin Twp increased to moderate-to-severe intensity.
1962	Moderate-to-severe infestation persisted in Mongowin Twp.
1963	The infestation in Mongowin Twp declined to light intensity.
1964-1966	not reported
1967	low numbers detected in Salter Twp
1968	low numbers found commonly in the district
1969-1980	not recorded

Eastern Spruce Gall Adelgid, *Adelges abietis* (Linn.)

Host(s): spruce [Major]

Year	Remarks
1950-1963	not reported
1964-1965	heavy infestations reported in plantations on Manitoulin and Cockburn islands
1966	Heavy infestations recurred on Cockburn Island.
1967-1973	not reported
1974	numerous galls found at one location in Burpee Twp
1975-1980	not reported

Spruce Gall Adelgid, *Adelges laricistus* (Patch)

Host(s) spruce, larch [Major]

Year	Remarks
1950-1956	not reported
1957	light infestation found in Baldwin Twp
1958-1962	not reported
1963	moderate-to-severe infestation detected in Dawson Twp
1964-1974	not reported
1975	moderate-to-severe damage noted on open-growing trees in Carnarvon Twp
1976-1980	not reported

Bronze Poplar Borer, *Agrilus liragus* Bart. & Br.

Host(s): poplar [Major]

Year	Remarks
1950-1965	not reported
1966	Sucker growth in a plantation of hybrid stock was severely attacked.
1967-1980	not reported

Pine Spittlebug, *Aphrophora cribrata* (Walker)

Host(s): conifers [Major]

Year	Remarks
1950-1966	not reported
1967-1968	heavy infestations noted in plantations on Manitoulin Island
1969	medium-to-heavy infestations reported in Dawson, Sandfield, Gordon, Bidwell, Carnarvon and Oshell twps
1970	Moderate-to-severe damage to Scots pine recurred on Manitoulin Island.
1971	Previous high populations declined to light intensity except in Sandfield and Billings twps where populations remained high.
1972	Light infestations occurred in Sandfield, Billings and Carnarvon twps and medium-to-heavy infestations were recorded in Dawson and Gordon twps.
1973	low numbers commonly found on Manitoulin Island
1974	Population increases caused moderate-to-severe defoliation in Gordon, Carnarvon, Dawson, Billings and Sandfield twps.

(cont'd)

Pine Spittlebug, *Aphrophora cribrata* (Walker) (concl.)

Year	Remarks
1975	Populations were still high in Gordon and Carnarvon twps while populations declined to low numbers in other previously affected twps.
1976	The situation remained the same as in the previous year.
1977	Previous high populations declined to low numbers.
1978	not reported
1979	low numbers widespread in Merritt and Nairn twps and on Manitoulin Island
1980	light populations observed throughout the district, with the highest numbers occurring in Victoria and Carnavon twps; twig mortality recorded in Dawson Twp

Uglynest Caterpillar, *Archips cerasivoranus* (Fitch)

Host(s): cherry [Major]

Year	Remarks
1950-1956	not reported
1957	nests found frequently in the district
1958	heavy infestations recorded in five townships in the Espanola area and on Manitoulin Island
1959	light to moderate-to-severe infestations detected in the district
1960	Moderate-to-severe infestations occurred in Hallam Twp and on Great La Cloche Island.
1961-1964	not reported
1965	clumps of heavy infestation found in Victoria and Baldwin twps

(cont'd)

Uglynest Caterpillar, *Archips cerasivoranus* (Fitch) (concl.)

Year	Remarks
1966	High populations occurred on trees in the west end of Manitoulin Island.
1967	moderate-to-severe defoliation noted in Carnarvon and Salter twps
1968	heavy infestations noted in Salter, Weeks and Bidwell twps
1969-1975	not reported
1976	pockets of medium-to-heavy infestations observed in Allan Twp
1977	light defoliation detected at several spots in the district
1978	high populations observed in Victoria Twp
1979	low numbers found in the district
1980	not reported

Birch Sawfly, *Arge pectoralis* (Leach)

Host(s): birch [Major]

Year	Remarks
1950-1952	Moderate-to-severe defoliation occurred throughout Manitoulin Island.
1953	not reported
1954	low populations detected in Carnarvon and Teasdale twps
1955-1980	not reported

Cedar Leafminer, *Argyresthia aureoargentella* Brower

Host(s): cedar [Major]

Year	Remarks
1950-1977	not reported
1978	moderate-to-severe browning recorded in Carnarvon Twp
1979-1980	not reported

Jack Pine Midge, *Cecidomyia resinicoloides* Will.

Host(s): jP [Minor]

Year	Remarks
1950-1957	not reported
1958	Moderate-to-severe damage occurred in Merritt Twp and light infestations were noted in Nairn, Ouellette and Moses twps.
1959	moderate-to-severe damage recorded in a plantation in Merritt Twp
1960-1980	not reported

Maple Basswood Leafroller, *Cenopis pettitana* (Rob.)

Host(s): Ba, maple [Minor]

Year	Remarks
1950-1969	not reported
1970	light infestations detected in Gordon Twp
1971	not reported

(cont'd)

Maple Basswood Leafroller, *Cenopis pettitana* (Rob.) (concl.)

Year	Remarks
1972	moderate-to-severe infestations recorded in Howland, Sandfield, Bidwell and Gordon twps and on Birch Island
1973-1980	not reported

Larch Casebearer, *Coleophora laricella* (Hbn.)

Host(s): larch [Major]

Year	Remarks
1950-1953	not reported
1954	light infestations recorded in Hallam and Shedden twps
1955	low numbers detected in Victoria Twp
1956	not recorded
1957	very low populations detected in Bidwell Twp
1958-1959	low numbers observed in Bidwell and Hallam twps
1960	Populations declined to low numbers.
1961-1963	Populations remained low.
1964	not reported
1965-1967	populations low in the district
1968	Populations remained low except for a few severely defoliated trees in Campbell Twp.
1969	Previous high populations in Campbell Twp declined to low.
1970-1971	only low populations observed in the district
1972	not reported
1973-1979	not reported
1980	small numbers detected in the district

Red Pine Cone Beetle, *Conophthorus resinosae* Hopk.

Host(s): rP [Minor]

Year	Remarks
1950-1970	not reported
1971	light infestation found on small plantation trees in Weeks Twp
1972-1973	not reported
1974	High populations caused extensive mortality of developing shoots of trees in Victoria Twp.
1975-1980	not reported

European Pine Needle Midge, *Contarinia baeri* (Prell)

Host(s): rP, scP [Major]

Year	Remarks
1950-1954	not reported
1955	severe damage recorded in a plantation in Nairn Twp
1956	The infestation in Nairn Twp subsided to light intensity.
1957	occasional larvae and branch mortality observed in Nairn plantation
1958-1980	not reported

Oak Leaf Shredder, *Croesia semipurpurana* (Kft.)

Host(s): oak [Major]

Year	Remarks
1950-1965	not reported
1966-1967	a pocket of heavy infestation detected in Gordon Twp
1968	a few heavily infested trees found in Shedden Twp
1969	moderate-to-severe defoliation again detected in Gordon Twp
1970	not reported
1971	moderate-to-severe infestations reported in Gordon Twp
1972-1973	Heavy infestations occurred in all oak stands.
1974	medium-to-heavy infestations present in Gordon and Robinson twps and on Barrie Island
1975	Pockets of heavy infestation persisted on Manitoulin Island.
1976	severe damage detected in Shedden Twp and throughout most of Manitoulin Island
1977	Moderate-to-severe defoliation was observed in Gordon and Dawson twps and on Indian Reserve No. 4.
1978	Populations declined; only low numbers were found in the district.
1979	A pocket of moderate-to-severe infestation occurred in Gordon Twp.
1980	areas of light defoliation detected on Manitoulin Island

Maple Trumpet Skeletonizer, *Epinotia aceriella* (Clem.)

Host(s): maple [Minor]

Year	Remarks
1950-1970	not reported
1971	medium-to-heavy infestation noted on Cockburn Island
1972	moderate-to-severe damage reported in Mills Twp
1973-1980	not reported

Yellowheaded Aspen Leaftier, *Epinotia nisella* Clerck.

Host(s): aspen [Minor]

Year	Remarks
1950-1961	not reported
1962	moderate-to-severe infestations reported in Merritt Twp and on Manitoulin Island
1963	moderate-to-severe defoliation widespread in southern part of district except on Manitoulin Island where populations declined
1965-1980	not reported

Birch-Aspen Leafroller, *Epinotia solandriana* Linn.

Host(s): birch, poplar [Major]

Year	Remarks
1950-1961	not reported
1962	moderate-to-severe damage found around Shakwa Lake
1963-1965	not reported
1966	moderate-to-severe infestation detected in Hallam Twp
1967	Areas of light defoliation noted in Carnarvon and Hallam twps.
1968	light infestations detected in Burpee, Shedden and Oshell twps
1969-1980	not reported

Poplar-and-Willow Borer, *Cryptorhynchus lapathi* (Linn.)

Host(s): poplar, w [Major]

Year	Remarks
1950-1957	not reported
1958	light infestations on hybrid poplar on Manitoulin Island
1959-1980	not reported

Yellownecked caterpillar, *Datana ministra* (Dru.)

Host(s): deciduous [Minor]

Year	Remarks
1950-1953	not reported
1954	light defoliation found in Billings Twp
1955-1975	not reported
1976	severe defoliation noted on small trees in Nairn Twp
1977-1980	not reported

Aspen Twoleaf Tier, *Enargia decolor* (Wlk.)

Host(s): poplar [Major]

Year	Remarks
1950-1959	not reported
1960	moderate-to-severe defoliation of regeneration reported in Salter and Cascaden twps
1961-1980	not reported

Linden Looper, *Erannis tiliaria* (Harr.)

Host(s): deciduous [Major]

Year	Remarks
1950-1959	not reported
1960	moderate-to-severe damage detected at several locations on the east end of Manitoulin Island
1961	Light to moderate-to-severe defoliation occurred on the southeast end of Manitoulin Island.
1962	The infestation at the southeast end of Manitoulin Island subsided but a new pocket of moderate-to-severe defoliation was recorded in Allan Twp.
1963	The previous infestation in Allan Twp collapsed.
1964-1967	not reported
1968	pockets of severely defoliated trees observed in Gordon Twp
1969-1970	not reported
1971	moderate-to-severe defoliation noted within the town of Espanola
1972	not reported
1973	low populations present in Victoria Twp and on Manitoulin Island
1974	not reported
1975	light infestations noted in Victoria, Dawson, Carnarvon and Deagle twps
1976	moderate-to-severe defoliation detected in Carnarvon, Sandfield and Shedden twps
1977	Previous infestations declined to light intensity.
1978-1980	not reported

Eastern Pine Shoot Borer, *Eucosma gloriola* Heinr.

Host(s): pine [Major]

Year	Remarks
1950-1955	not reported
1956	Light damage occurred in Nairn Twp.
1957-1960	not reported
1961	severe damage reported in Weeks Twp
1962	High populations continued in Weeks Twp where 32% of the leaders were infested.
1963-1964	population declines noted in the district
1965	A plantation in Merritt Twp had 13% of the leaders infested; elsewhere populations were low.
1966	little change from previous year
1967	low populations detected in the district
1968-1980	not reported

Pine Needleminer, *Exoteleia pinifoliella* (Cham.)

Host(s): jack pine [Major]

Year	Remarks
1950-1959	not reported
1960	moderate-to-severe mining found in Carnarvon Twp
1961	light infestation recorded in Carnarvon Twp and on Great La Cloche Island
1962-1963	Decreased populations caused moderate-to-severe damage in Carnarvon Twp.

(cont'd)

Pine Needleminer, *Exoteleia pinifoliella* (Cham.) (concl.)

Year	Remarks
1964	Previous heavy infestation in Carnarvon Twp subsided to low intensity
1965-1966	not reported
1967	light mining detected in Carnarvon Twp
1968	low numbers observed in the southern part of the district
1969-1980	not reported

Birch Leafminer, *Fenusa pusilla* (Lep.)

Host(s): birch [Major]

Year	Remarks
1950	not reported
1951	light infections recorded in Victoria and Salter twps
1952-1963	not reported
1964-1965	moderate-to-severe defoliation noted on small open trees on the Spanish River Indian Reserve
1966	Marked increase in populations occurred in the southern part of the district.
1967	severe damage reported in the southern part of the district
1968	generally low numbers observed except for Durban Twp which experienced high populations
1969	not reported
1970	low numbers detected in Nairn and Burpee twps

(cont'd)

Birch Leafminer, *Fenusa pusilla* (Lep.) (concl.)

Year	Remarks
1971	low populations observed in the district
1972	high populations noted in Burpee Twp
1973	light infestations detected in areas around McKerrow and Massey
1974	light defoliation observed in Victoria, Salter and Nairn twps and on Manitoulin Island
1975-1976	light damage common at numerous locations in the district
1977	moderate-to-severe defoliation recorded on open-growing trees in Gordon Twp
1978	not reported
1979	light damage noted at several points in the district
1980	not recorded

Nursery Pine Sawfly, *Gilpinia frutetorum* (F.)

Host(s): pine [Minor]

Year	Remarks
1950-1971	not reported
1972	Low populations on Cockburn Island represented a new distribution record.
1973-1980	not reported

European Spruce Sawfly, *Gilpinia hercyniae* (Htg.)

Host(s): spruce [Minor]

Year	Remarks
1950	low numbers detected in the district
1951-1958	not reported
1959	low numbers detected throughout the district
1960	population increases noted in the southern part of the district
1961	low populations confined to the southern part of the district
1962	Populations declined except in Salter and Hallam twps.
1963	low populations reported in the district
1964	Populations remained low.
1965	Populations were still low but increases were noted on Manitoulin Island.
1966	population increases again observed in the southern part of the district
1967	Surveys indicated a general decline in populations.
1968	A further decrease in numbers occurred.
1969	population increases recorded in Hallam Twp
1970-1980	not reported

American Aspen Beetle, *Gonioctena americana* (Schaef.)

Host(s): poplar [Major]

Year	Remarks
1950-1953	not reported

(cont'd)

American Aspen Beetle, *Gonioctena americana* (Schaef.) (concl.)

Year	Remarks
1954	light infections reported in Del Villano and Beebe twps
1955-1956	not reported
1957	small numbers found in the district
1958	light damage observed in Cascaden Twp and along Massey Tote Road
1959-1960	not recorded
1961	moderate-to-severe defoliation along Massey Tote Road from Salter Twp north to Cadeau Twp
1962-1963	not reported
1964	severe defoliation observed in Oshell Twp
1965	moderate-to-heavy infestations recorded on regeneration in Nairn Twp
1966-1974	not reported
1975	medium-to-heavy infestations recorded on regeneration in Nairn Twp
1976	not reported
1977	light defoliation observed in Strain Twp
1978	The previous light infestation declined to scattered larvae.
1979	not recorded
1980	light damage noted in Mongowin Twp

Saddled Prominent, *Heterocampa guttivitta* (Wlk.)

Host(s): sM, Be [Major]

Year	Remarks
1950-1975	not reported
1976	pockets of heavy infestation found on Manitoulin Island
1977	Previous high populations declined to endemic levels.
1978-1980	not reported

Fall Webworm, *Hyphantria cunea* (Dru.)

Host(s): deciduous [Major]

Year	Remarks
1950	moderate-to-severe infestations noted along Massey Tote Road; elsewhere only low populations detected
1951-1953	not reported
1954	light damage observed in Teasdale, Cadeau, Shibananing and Weeks twps
1955	scattered tents found in Cadeau and Rowat twps
1956	an increase in populations noted in the district
1957	found commonly in the district
1958	light infestations noted in Hallam Twp and on the east end of Manitoulin Island
1959	population declines observed in the district
1960-1966	not reported
1967	high populations on scattered individual trees noted on Cockburn Island
1968	several webs detected in Victoria Twp

(cont'd)

Fall Webworm, *Hyphantria cunea* (Dru.) (concl.)

Year	Remarks
1969-1970	not reported
1971	found on Manitoulin Island and on shade trees in the town of Espanola
1972-1974	not reported
1975	low populations observed on Manitoulin Island
1976	commonly found in the southern part of the district
1977	occasional tents observed on Manitoulin Island
1978-1980	not reported

Pine Engraver, *Ips pini* (Say)

Host(s): pine [Major]

Year	Remarks
1950-1955	not reported
1956	Light infestations on weakened trees caused light tree mortality in a Nairn Twp plantation.
1957	Populations collapsed in the Nairn plantation.
1958-1980	not reported

Hemlock Looper, *Lambdina fiscellaria fiscellaria* (Gn.)

Host(s): general feeder [Major]

Year	Remarks
1950	light infestations recorded on east and west ends of Manitoulin Island

(cont'd)

Hemlock Looper, *Lambdina fiscellaria fiscellaria* (Gn.) (concl.)

Year	Remarks
1951	light infestations recorded on east and west ends of Manitoulin Island
1952-1960	not reported
1961	low populations present on Manitoulin Island
1962-1980	not reported

Eastern Tent Caterpillar, *Malacosoma americanum* F.

Host(s): cherry [Major]

Year	Remarks
1950	light infestations detected in the southern part of the district and on Manitoulin Island
1951	not reported
1952	moderate-to-severe defoliation recorded in Campbell and Tehkummah twps
1953	numerous tents observed in the district
1954	a decline in the number of tents noted in the district
1955	light infestations observed in Shakespeare and Sheguiandah twps
1956-1957	low numbers recorded in the district
1958	not recorded
1959	low populations recorded in the district
1960	increased numbers observed on Manitoulin Island
1961	population increases noted on Manitoulin and Great La Cloche Islands

(cont'd)

Eastern Tent Caterpillar, *Malacosoma americanum* F. (concl.)

Year	Remarks
1962-1963	light infestations reported in the southern part of the district
1964	high populations recorded on Great La Cloche Island and the east end of Manitoulin Island
1965	Previous infestations declined to light.
1966	Heavy infestations occurred in Merritt Twp and on Great La Cloche Island.
1967	Populations decreased in Merritt Twp but high populations were observed in Riddell Twp.
1968-1973	not reported
1974	numerous tents observed on Manitoulin Island
1975-1976	not reported
1977	light defoliation present on Manitoulin Island
1978-1980	not reported

Northern Tent Caterpillar, *Malacosoma californicum pluviale* Dyar

Host(s): cherry [Major]

Year	Remarks
1950-1958	not reported
1959	low populations present in the district
1960-1980	not reported

Sawyer Beetles, *Monochamus* spp.

Host(s): coniferous [Major]

Year	Remarks
1950	A 2-ha stand in a mill yard in Espanola was severely damaged by high populations in stacked wood.
1951-1980	not reported

Cedar sawfly, *Monoctenus fulvus* (Nort.)

Host(s): cedar, juniper [Minor]

Year	Remarks
1950	not reported
1951	low numbers detected throughout the district
1952-1956	not reported
1957	light infestation noted on west shore of Mozhabong Lake and small numbers collected in Beebe Twp
1958	not reported
1959	low numbers detected in the district
1960-1980	not detected

Balsam Fir Sawfly, *Neodiprion abietis* complex

Host(s): bF [Major]

Year	Remarks
1950	not reported
1951	light defoliation recorded in Foster, Merritt, Hotte, Victoria and Shedden twps

(cont'd)

Balsam Fir Sawfly, *Neodiprion abietis* complex (concl.)

Year	Remarks
1952	low numbers detected in the district
1953	low populations collected in Billings and Mongowin twps
1954	low numbers found in Hallam Twp
1955-1957	not reported
1958	light infestation detected in Tehkummah Twp and colonies collected in Allan, Cascaden and Hallam twps and on Birch Island
1959	Increased populations caused light defoliation on Manitoulin Island.
1960	Light infestations persisted in Howland and Tehkummah twps.
1961	light infestations detected in Howland Twp and on Birch Island
1962	Light infestations continued on Manitoulin and Birch Islands and moderate-to-severe damage occurred on Cockburn Island.
1963	Previous light infestations declined to scattered colonies.
1964	pockets of light damage found in Mills Twp
1965	Infestations on Manitoulin Island collapsed.
1966-1980	not reported

Spiny Elm Caterpillar, *Nymphalis antiopa* (L.)

Host(s): deciduous [Minor]

Year	Remarks
1950-1953	not reported

(cont'd)

Spiny Elm Caterpillar, *Nymphalis antiopa* (L.) (concl.)

Year	Remarks
1954	scattered larvae detected in Moses, McKinnon, Sandfield and Sheguiandah twps
1955	low numbers recorded in Shedden Twp
1956-1961	not reported
1962	light defoliation of trees in the Espanola area
1963-1980	not reported

White-marked Tussock Moth, *Orgyia leucostigma intermedia* Fitch

Host(s): general feeder [Minor]

Year	Remarks
1950-1953	not reported
1954	severe damage to ornamental mountain-ash in Gore Bay
1955-1980	not reported

Northern Pitch Twig Moth, *Petrova albicapitana* (Busck.)

Host(s): jP [Minor]

Year	Remarks
1950-1953	not reported
1954	low numbers found on Great La Cloche Island
1955	not reported
1956	low numbers detected in the district

(cont'd)

Northern Pitch Twig Moth, *Petrova albicapitana* (Busck.) (concl.)

Year	Remarks
1957	light infestation noted on Great La Cloche Island
1958-1967	not reported
1968	low incidence of pitch nodules found in Lefebvre and Cockburn twps
1969-1980	not reported

Aspen Skeletonizer, *Phratora purpurea purpurea* Brown

Host(s): poplar [Minor]

Year	Remarks
1950-1973	not reported
1974	light damage recorded in Salter and May twps and on Manitoulin Island
1975-1980	not reported

European Snout Beetle, *Phyllobius oblongus* (Linn.)

Host(s): deciduous [Minor]

Year	Remarks
1950-1970	not reported
1971	Severe defoliation of trees occurred near a golf course in Carnarvon Twp.
1972	Medium-to-heavy infestations persisted in Carnarvon Twp.
1973	The previous infestation in Carnarvon Twp declined to light intensity.

(cont'd)

European Snout Beetle, *Phyllobius oblongus* (Linn.) (concl.)

Year	Remarks
1974	not reported
1975-1976	high populations again observed in Carnarvon Twp
1977	control measures instituted at infestation at golf course in Carnarvon Twp
1978-1980	not reported

Ragged Spruce Gall Adelgid, *Pineus similis* (Gill.)

Host(s): spruce [Minor]

Year	Remarks
1950-1966	not reported
1967	moderate-to-severe damage detected in Burpee Twp and on Cockburn Island
1968	a few heavily infested trees reported on Manitoulin Island
1969-1980	not reported

Balsam Shootboring Sawfly, *Pleroneura brunneicornis* Roh.

Host(s): bF [Minor]

Year	Remarks
1950-1957	not reported
1958	considerable mining observed in Tennyson Twp
1959	Populations declined; only low numbers were observed in the district.

Balsam Shootboring Sawfly, *Pleroneura brunneicornis* Roh. (Concl.)

Year	Remarks
1960	pocket of moderate-to-severe defoliation found in Alton Twp
1961	not reported
1962	high populations observed in Salter Twp where 32% of the developing shoots were infested
1963	Populations declined to very low numbers in the district.
1964	generally light damage with some scattered clumps of moderate-to-severe damage observed in the district
1965-1971	not reported
1972	medium-to-heavy infestation found in Cadeau Twp
1973-1980	not reported

Mountain-ash Sawfly, *Pristiphora geniculata* (Htg.)

Host(s): aMo [Major]

Year	Remarks
1950-1957	not reported
1958	moderate-to-severe defoliation noted along the Massey Tote Road
1959	Light-to-moderate-to-severe defoliation occurred along the Massey Tote Road and in Hallam, Trill and Cascaden twps.
1960	observed at several locations in the northern part of the district for the first time
1961-1966	not reported
1967	areas of moderate-to-severe observed in Salter, Hallam and Cascaden twps

(cont'd)

Mountain-ash Sawfly, *Pristiphora geniculata* (Htg.) (concl.)

Year	Remarks
1968-1972	not reported
1973	pockets of moderate-to-severe defoliation found in Victoria Twp
1974-1975	moderate-to-severe defoliation recorded on ornamentals in the town of Espanola
1976	not reported
1977	low numbers found in Nairn Twp
1978-1979	low numbers detected throughout the district
1980	Populations declined to endemic levels.

Ambermarked Birch Leafminer, *Profenusa thomsoni* (Konow)

Host(s): birch [Major]

Year	Remarks
1950-1953	not reported
1954	light damage observed in Dennie Twp
1955-1965	not reported
1966	light infestations detected in Del Villano, Beebe and Durban twps
1967	numerous mined leaves observed in Weeks and Moses twps
1968-1970	not reported
1971	light defoliation recorded in Nairn Twp
1972	Populations remained low in the district.
1973-1980	not reported

Aspen Leafroller, *Pseudexentera oregonana* Wlshm.

Host(s): poplar [Major]

Year	Remarks
1950-1964	not reported
1965	heavy infestation recorded in Hallam Twp
1966	Previous high populations declined to low numbers.
1967-1976	not reported
1977	light damage detected at several locations in the district
1978	not reported
1979	Light infestations occurred in Assiginack, Mongowin, Carnarvon and Billings twps.
1980	not reported

Orange Spruce Needle Miner, *Pulicalvaria piceaella* (Kft.)

Host(s): spruce [Minor]

Year	Remarks
1950-1968	not reported
1969	medium-to-heavy infestations observed in Bidwell and Sandfield twps
1970-1980	not reported

Spearmarked Black Moth, *Rheumaptera hastata* (Linn.)

Host(s): birch, alder, etc. [Major]

Year	Remarks
1950-1966	not reported

(cont'd)

Spearmarked Black Moth, *Rheumaptera hastata* (Linn.) (concl.)

Year	Remarks
1967	light infestations noted on Cockburn Island
1968-1980	not reported

Pine Tip Moth, *Rhyacionia adana* Heinr.

Host(s): pine [Major]

Year	Remarks
1950-1962	not reported
1963	severe infestation recorded in a plantation in Merritt Twp
1964-1980	not reported

European Pine Shoot Moth, *Rhyacionia buoliana* (Schiff.)

Host(s): pine [Major]

Year	Remarks
1950-1961	not reported
1962	light infestations noted on Cockburn and Manitoulin islands
1963	moderate-to-severe infestation noted in Mills Twp
1964	Increased populations were recorded in Mills Twp and moderate-to-severe damage occurred in a plantation on Cockburn Island.
1965	Populations declined to low numbers in Mills Twp; the severe infestation on Cockburn Island continued.

(cont'd)

European Pine Shoot Moth, *Rhyacionia buoliana* (Schiff.) (concl.)

Year	Remarks
1966	The infestation on Cockburn Island declined to light intensity.
1967-1969	not reported
1970	medium-to-heavy infestation recorded in a plantation in Mills Twp where 23% of the shoots were infested
1971	medium-to-heavy infestations reported in Mills Twp and on Cockburn Island
1972	Previous infestations declined to light intensity.
1973-1980	not reported

Aspen Webworm, *Tetralopha aplastella* (Hlst.)

Host(s): aspen, birch [Minor]

Year	Remarks
1950-1970	not reported
1971	high populations recorded in Hotte Twp
1972-1980	not reported

Spruce Bud Moth, *Zeiraphera canadensis* Mut. & Free.

Host(s): spruce [Major]

Year	Remarks
1950-1960	not reported
1961-1962	Severe infestations occurred on Manitoulin Island.
1963	Moderate-to-severe damage recurred on Manitoulin Island.

(cont'd)

Spruce Bud Moth, *Zeiraphera canadensis* Mut. & Free. (concl.)

Year	Remarks
1964	a decline in intensity evident in district although damage still moderate-to-severe on Manitoulin Island
1965	Heavy infestations persisted on Manitoulin Island.
1966	not reported
1967	Populations declined to low on Manitoulin Island.
1968	not reported
1969	moderate-to-severe damage detected in Billings Twp
1970-1980	not reported

DISEASES

Armillaria Root Rot, *Armillaria mellea* (Vahl ex Fr.) Kumm.

Host(s): coniferous, deciduous [Major]

Year	Remarks
1950-1963	not reported
1963-1965	Light mortality occurred in plantations and natural stands throughout the district.
1966-1969	not reported
1970	The root rot caused 27.5% mortality in a six-year-old red pine plantation in Dunlop Twp. In Mandamin Twp, 10% mortality was reported in a white pine plantation.
1971	A damage evaluation found 5% mortality in a red pine plantation in Hallam Twp.
1972-1974	low incidence
1975-1976	not reported
1977	Evaluations revealed a 5% mortality rate in plantations in Plourde and Lefebvre twps.
1978	A low incidence of this disease was reported in the district.
1979-1980	Trace infections were common, particularly in immature stands.

Dutch Elm Disease, *Ceratocystis ulmi* (Buism.) C. Moreau

Host(s): elm [Major]

Year	Remarks
1950-1964	not reported
1965	A new extension in distribution was reported. The presence of the disease was confirmed at Spanish, and in the villages of Manitowaning and Mindemoya on Manitoulin Island.

(cont'd)

Dutch Elm Disease, *Ceratocystis ulmi* (Buism.) C. Moreau (concl.)

Year	Remarks
1966	The disease continued to spread. New areas of infection were found in Billings and Sandfield twps on Manitoulin Island and in Baldwin Twp.
1967-1969	No change occurred in the status of the disease.
1970	Increasing numbers of trees were observed dying between Espanola and Sault Ste. Marie.
1971-1972	widespread in the district
1973	Evaluations in five townships revealed the average incidence of the disease to be 31%.
1974	The average rate of mortality in six townships for the period 1973-1974 was 17%.
1975	The average mortality rate was 29% in three townships.
1976-1980	not reported

Needle Rusts of Spruce, *Chrysomyxa ledi* (Alb. & Schw.) d By. and
C. ledicola Lagh.

Host(s): spruce [Major]

Year	Remarks
1950-1957	not reported
1958	Numerous scattered infections occurred on regeneration.
1959	Varying degrees of infection occurred at numerous points.
1960	The disease was commonly found in the district.
1961	not reported
1962-1965	Trace infections were observed.
1966-1969	not reported

(cont'd)

Needle Rusts of Spruce, *Chrysomyxa ledi* (Alb. & Schw.) d By. and *C. ledicola* Lagh. (concl.)

Year	Remarks
1970-1973	Trace infections were observed.
1974	not reported
1975	Trace infections were reported.
1976	not reported
1977	A high incidence was reported in Comox Twp.
1978-1980	Trace infections were observed at scattered locations in the district.

Ink Spot, *Ciborinia whetzelii* (Seaver) Seaver

Host(s): tA [Major]

Year	Remarks
1950-1957	not reported
1958-1959	Varying degrees of infection were recorded in the district.
1960	Small pockets of heavy infection were observed at widely scattered points in the district.
1961	not reported
1962-1964	Scattered pockets of heavy infection were observed at widely scattered points.
1965	Light-to-moderate pockets of infection were observed in the district.
1966-1967	Small areas of heavy infection were observed on pole-sized aspen stands at widely scattered points.
1968-1969	Trace infections were observed on hybrid poplar on Manitoulin Island.

Ink Spot, *Ciborinia whetzelii* (Seaver) Seaver (concl.)

Year	Remarks
1970	not reported
1971	Moderate infections were observed in Mongowin and Merritt twps.
1972-1973	Trace infections were observed.
1974	Pockets of light damage were observed.
1975	An evaluation revealed 40% defoliation in Shakespeare Twp.
1976	An average defoliation of 25% was recorded in Carnarvon and Dunlop twps.
1977	Trace infections were observed.
1978	Light infections were observed in four townships.
1979	An average of 54% of the trees were affected in seven townships, with 4% overall defoliation.
1980	Light foliar damage was reported at various locations in the district.

White Pine Blister Rust, *Cronartium ribicola* J.C. Fisch.

Host(s): wP [Major]

Year	Remarks
1950-1959	not reported
1960-1962	Varying degrees of damage caused by this disease were found in the district.
1963-1967	This disease was detected at low levels throughout the district.
1968	Moderate-to-severe infections were reported in Salter Twp.
1969	not reported

(cont'd)

White Pine Blister Rust, *Cronartium ribicola* J.C. Fisch. (concl.)

Year	Remarks
1970-1971	A low incidence was detected in the district.
1972	a moderate infection in a 2-ha plantation in Hotte Twp
1973	Surveys revealed that the average number of trees affected in Mills and Oshell twps was 12.5% and 15%, respectively.
1974	A low incidence of the disease was reported in the district.
1975	Severe damage occurred to 5% of large-diameter trees in a 12-ha stand in Robinson Twp. A 6% infection was recorded in an 8-ha plantation in Foster Twp.
1976	An evaluation revealed that 14% of the trees in a plantation in Merritt Twp were affected.
1977	Surveys showed that 17% of the trees in a plantation in Merritt Twp and 19% of the trees in a plantation in Foster Twp were affected.
1978-1980	Trace infections were observed wherever the host was found.

Scleroderris Canker, *Gremmeniella abietina* (Lagerb.) Morelet

Host(s): pine [Major]

Year	Remarks
1950-1965	not reported
1966	The first record of this disease was reported in Salter Twp where 4% of the trees examined suffered mortality.
1967-1968	No change was observed in the status of this disease.
1969-1970	not reported

(cont'd)

Scleroderris Canker, *Gremmeniella abietina* (Lagerb.) Morelet (concl.)

Year	Remarks
1971	An evaluation in the red pine plantation in Salter Twp revealed that 53% of the trees were affected. An increase in mortality was also noted.
1972-1973	No change occurred in the status of this disease.
1974	No infections were reported. Surveys in Salter Twp, where a sanitation project had been carried out, yielded negative results.
1975-1980	not reported

Hypoxylon Canker, *Hypoxylon mammatum* (Wahl.) J.H. Miller

Host(s): aspen [Major]

Year	Remarks
1950-1953	not reported
1954	The disease was commonly found in most aspen stands in the district.
1955-1963	not reported
1964	An evaluation revealed an infection rate of 11% in Hallam Twp.
1965	Diseased trees were observed in most stands in the district.
1966	Surveys indicated an infection rate of 12% in Hallam Twp.
1967	not reported
1968	A high rate of infection was reported in Monestime Twp.
1969-1972	The disease was found in most stands in the district.
1973	The disease was found in most aspen stands in the district.

(cont'd)

Hypoxylon Canker, *Hypoxylon mammatum* (Wahl.) J.H. Miller (concl.)

Year	Remarks
1974	not reported
1975	The disease was commonly found in the district.
1976-1977	not reported
1978	Light infections and low incidence of tree mortality were common in the district.
1979-1980	not reported

Shoot Blight, *Venturia macularis* (Fr.) Muller & Arx

Host(s): aspen [Major]

Year	Remarks
1950-1961	not reported
1962-1963	Pockets of heavy infection were found on open-growing roadside aspen reproduction.
1964	Numerous pockets of severe infection were observed along the Massey Tote Road and in Hallam Twp.
1965	Infected trees were commonly found throughout the district.
1966	A high incidence was found at widely scattered points in the district.
1967	Light-to-moderate infections were reported in the district.
1968-1969	Trace infections were reported.
1970-1971	not reported
1972-1975	Trace infections were reported.

(cont'd)

Shoot Blight, *Venturia macularis* (Fr.) Muller & Arx (concl.)

Year	Remarks
1976	Severe damage was reported in Shakespeare Twp.
1977	Moderate-to-high infections were reported in Nairn Twp.
1978-1979	not reported
1980	Regeneration in Salter Twp suffered infections of this tip blight.

Rusts of Pine, Comandra Blister Rust, *Cronartium comandrae* Pk., Sweet-fern Blister Rust, *C. comptoniae* Arth., Eastern Gall Rust, *C. quercuum* (Berk.) Miy. ex Shirai, and Globose Gall Rust, *Endocronartium harknessii* (J.P. Moore) Y. Hirat.

Host(s): pine [Major]

Year		Remarks
1950-1958		not reported
1959	*C. comptoniae*	Galls were commonly found in the district.
1960-1961		not reported
1962	*C. quercuum*	The rust was found at scattered locations in the district.
	C. comptoniae	Trace infections were observed in the district.
1963	*C. quercuum*	Light infections were recorded in the district.
	C. comptoniae	An evaluation revealed that 13% of the trees were infected at a location in Mandamin Twp.

(cont'd)

Rusts of Pine, Comandra Blister Rust, *Cronartium comandrae* Pk.,
Sweet-fern Blister Rust, *C. comptoniae* Arth.,
Eastern Gall Rust, *C. quercuum* (Berk.) Miy. ex Shirai,
and Globose Gall Rust, *Endocronartium harknessii*
(J.P. Moore) Y. Hirat. (cont'd)

Year		Remarks
1963	*C. comandra*	Trace infections were found in four townships.
1964	*C. comptoniae*	Basal stem cankers were observed at widely scattered points in the district.
1965	*C. comptoniae*	An evaluation in a nursery near Espanola showed that 10% of the trees were infected. A survey in jack pine regeneration in Durban Twp revealed an incidence of 7%.
1966-1969		not reported
1970	*C. comptoniae*	Surveys revealed an incidence of 38% in Mandamin Twp. and 20% in Nairn Twp.
1971	*C. comptoniae*	The disease was commonly detected in the district.
	E. harknessii	Galls were easily found in the district.
1972	*C. comptoniae*	Widespread light infections were observed.
1973	*C. comptoniae*	Evaluations revealed the average incidence of the disease in five townships to be 22%.
	E. harknessii	Trace infections were reported at numerous points in the district.
1974	*E. harknessii*	A low incidence of the disease, confined mainly to small-diameter trees, was observed in the district.
1975	*C. comptoniae*	Trace infections were reported.
1976	*C. comptoniae*	Trace infections persisted in the district.
1977	*E. harknessii*	Galls were common in plantations on Manitoulin Island.

(cont'd)

Rusts of Pine, Comandra Blister Rust, *Cronartium comandrae* Pk.,
Sweet-fern Blister Rust, *C. comptoniae* Arth.,
Eastern Gall Rust, *C. quercuum* (Berk.) Miy. ex Shirai,
and Globose Gall Rust, *Endocronartium harknessii*
(J.P. Moore) Y. Hirat. (concl.)

Year		Remarks
1978		not reported
1979	*E. harknessii*	Surveys revealed infection rates of less than 3% in the district, with one exception. A single occurrence of severe damage was observed in Carnarvon Twp.
1980	*E. harknessii*	Trace infections were common in immature stands.

Other Noteworthy Diseases

Pine Needle Rust, *Coleosporium asterum* (Diet.) Syd.

Host(s): pines [Major]

Year	Remarks
1950-1959	not reported
1960	trace levels reported in the district
1961-1964	not reported
1965	small pockets of light infection observed on white and red pine trees at numerous points
1966-1973	not reported
1974	low incidence reported in the district
1975-1980	not reported

Leaf Spot, *Cylindrosporium* spp.

Host(s): wB [Minor]

Year	Remarks
1950-1977	not reported
1978-1980	Moderate damage occurred on small branches in Baldwin Twp.

Cytospora Canker, *Cytospora pini* Desm.

Host(s): wP [Major]

Year	Remarks
1950-1976	not reported

(cont'd)

Cytospora Canker, *Cytospora pini* Desm. (concl.)

Year	Remarks
1977	occasional dead trees observed in Foster and Merritt twps
1978-1980	not reported

Tar Spot Needle Cast, *Davisomycella ampla* (Davis) Darker

Host(s): jP [Major]

Year	Remarks
1950-1958	Severe damage occurred at numerous locations.
1959-1961	not reported
1962	commonly found in the district
1963	pockets of light infection reported at numerous points in the district
1964	light-to-heavy damage noted at numerous points in the district
1965	not reported
1966	pockets of light-to-moderate infections observed in the district
1967-1980	not reported

Eutypella Canker, *Eutypella parasitica* Davidson & Lorenz

Host(s): sugar maple [Major]

Year	Remarks
1950-1961	not reported
1962	common in stands of maple in the district
1963-1980	not reported

Cytospora Canker, *Leucostoma kunzei* (Fr.) Munk

Host(s): tL, wP, spruce [Major]

Year	Remarks
1950-1967	not reported
1968-1980	light infection noted in Robinson Twp

Needle Cast, *Lophodermium pinastri* (Shrad. ex Hook) Chev

Host(s): pine [Major]

Year	Remarks
1950-1955	not reported
1956 .	Severe foliage browning and needle droop occurred.
1957-1958	not reported
1959	common in district
1960	common in district on white pine
1961-1963	not reported
1964	severe infections observed affecting lower branches of jack pine in Oshell Twp
1965	not reported
1966	light infections recorded in the district
1967-1980	not reported

White Trunk Rot, *Phellinus igniarius* (Fr.) Quel.

Host(s): hardwoods, especially willow [Major]

Year	Remarks
1950-1953	not reported
1954	commonly found but mainly on aspen
1955-1959	not reported
1960	conks commonly observed at numerous locations
1961-1980	not reported

Leaf Spot, *Phyllosticta* sp.

Host(s): rO [Major]

Year	Remarks
1950-1977	not reported
1978	Moderate damage occurred on mature oak in Dawson Twp.

ABIOTIC DAMAGE

Drought

Year	Remarks
1950-1954	not reported
1955	A prolonged period of dry weather caused premature defoliation of deciduous trees in the district.
1956-1963	not reported
1964	Premature defoliation of white birch, red maple and red oak occurred on dry sites; tree mortality was observed at several locations.
1965-1975	not reported
1976	Premature leaf browning was common throughout the district.
1977-1980	not reported

Frost

Year	Remarks
1950-1963	not reported
1964	Severe damage to new shoots of balsam fir and white spruce occurred throughout the district.
1965	Severe damage occurred to balsam fir and white spruce in low-lying areas and to fringe and open-growing trees.
1966	Moderate damage was noted in some areas to balsam fir and white spruce.
1967	extensive damage to current foliage observed at several points in the district

Frost (concl.)

Year	Remarks
1968-1971	not reported
1972	severe damage to white spruce, balsam fir, red maple and trembling aspen noted in several areas
1973-1976	not reported
1977	severe foliar damage to balsam fir recorded in the northern part of the district
1978	a low incidence of damage reported in several areas
1979	not reported
1980	moderate-to-severe damage prevalent throughout the district, mainly on trembling aspen and balsam poplar

Rodent Damage

Year	Remarks
1950-1959	not reported
1960	Severe damage caused by rabbits was recorded at widely scattered locations.
1961-1980	not reported

Salt

Year	Remarks
1950-1965	not reported
1966	Red and white pine shelterbelts were severely damaged east and west of Massey along Hwy 17.
1967-1975	not reported

(cont'd)

Salt (concl.)

Year	Remarks
1976	severe damage observed along Hwy 17 from Shedden Twp east to May Twp
1977-1980	not recorded

Wind

Year	Remarks
1950-1969	not reported
1970	The area of damage was approximately .4 km wide and extended 14 km northwest of Webbwood east to Markstay; all tree species were affected and damage ranged from broken main stems to uprooted trees.
1971-1980	not reported

Winter Drying

Year	Remarks
1950-1958	not reported
1959	Severe discoloration was observed over sizeable low-lying areas and along highway windbreaks in the district.
1960-1962	not reported
1963	Young pine trees in several plantations were seriously damaged; new shoots failed to develop and mortality occurred.
1964	Light damage to young conifers, particularly red pine, was recorded in the district.

Winter Drying (cont'd)

Year	Remarks
1965	Small pockets of light needle browning were observed in plantations and natural regeneration of white, red and Scots pine.
1966	Severe browning of red pine occurred in Hallam Twp.
1967	Damage was prevalent throughout the district; the current year's buds developed and little permanent damage occurred.
1968-1972	not reported
1973	trace damage reported in the district
1974-1977	light damage recorded on red, jack and Scots pine trees
1978-1980	not reported

APPENDICES

APPENDIX A

DECIDUOUS HOST

Common Name	Scientific Name	Abbreviations
Alder	*Alnus* spp.	AL
Apple	*Malus* spp.	Ap
Ash, black	*Fraxinus nigra* Marsh.	As
Aspen, largetooth	*Populus grandidentata* Michx.	lA
trembling	*tremuloides* Michx.	tA
Basswood	*Tilia* spp.	Ba
Beech	*Fagus grandifolia* Ehrh.	Be
Birch, white	*Betula papyrifera* Marsh.	wB
yellow	*alleghaniensis* Britt.	yB
Butternut	*Juglans cinerea* L.	Bu
Cherry, eastern choke	*Prunus virginiana* L.	eaCh
pin	*pensylvanica* L.f.	pCh
Elm, white	*Ulmus americana* L.	wE
Horse-chestnut	*Aesculus hippocastanum* L.	hChe
Ironwood	*Ostrya* spp.	I
Maple, Manitoba	*Acer negundo* L.	mM
red	*rubrum* L.	rM
sugar	*saccharum* Marsh.	sM
Mountain-ash, American	*Sorbus americana* Marsh.	aMo
Oak, bur	*Quercus macrocarpa* Michx.	bO
red	*rubra L.*	rO
Poplar, balsam	*Populus balsamifera* L.	bPo
Carolina	*eugenei* Simon-Louis	cPo
Lombardy	*nigra* L.	lPo
silver	*alba* L.	sPo
Willow	*Salix* spp.	W

APPENDIX B

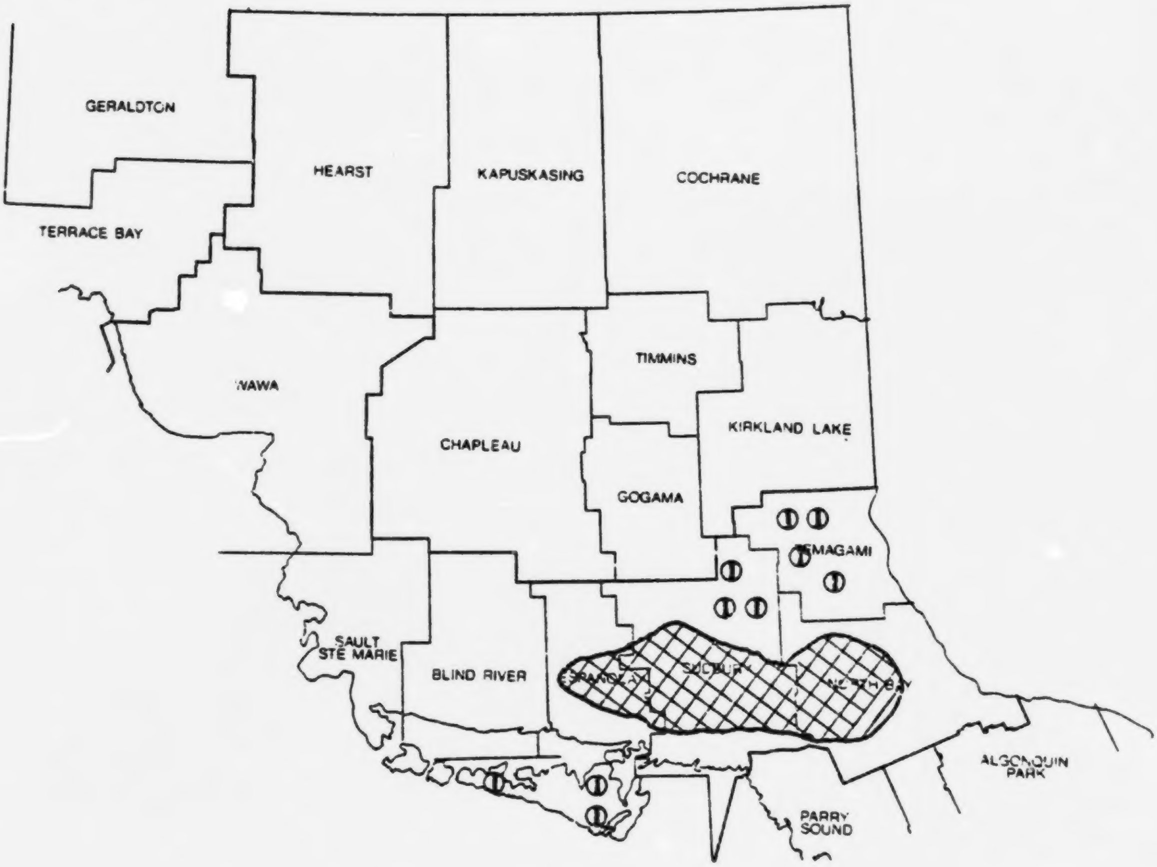
CONIFEROUS HOST

Common Name	Scientific Name	Abbreviations
Cedar, eastern white	*Thuja occidentalis* L.	eC
Fir, balsam	*Abies balsamea* (L.) Mill.	bF
Larch	*Larix laricina* (Du Roi) K. Koch	tL
Pine, Austrian	*Pinus nigra* Arn.	aP
eastern white	*strobus* L.	wP
jack	*banksiana* Lamb.	jP
mugho	*mugho* Turra	mP
red	*resinosa* Ait.	rP
Scots	*sylvestris* L.	scP
Spruce, black	*Picea mariana* (Mill.) B.S.P.	bS
Colorado	*pungens* Engelm.	colS
Norway	*abies* (L.) Karst.	nS
red	*rubens* Sarg.	rS
white	*glauca* (Moench) Voss	wS

APPENDIX C

MAPS - NORTHEASTERN ONTARIO

NORTHEASTERN ONTARIO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TEMAGAMI
SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

0 Miles 60

0 Kilometres 96

Birch Skeletonizer

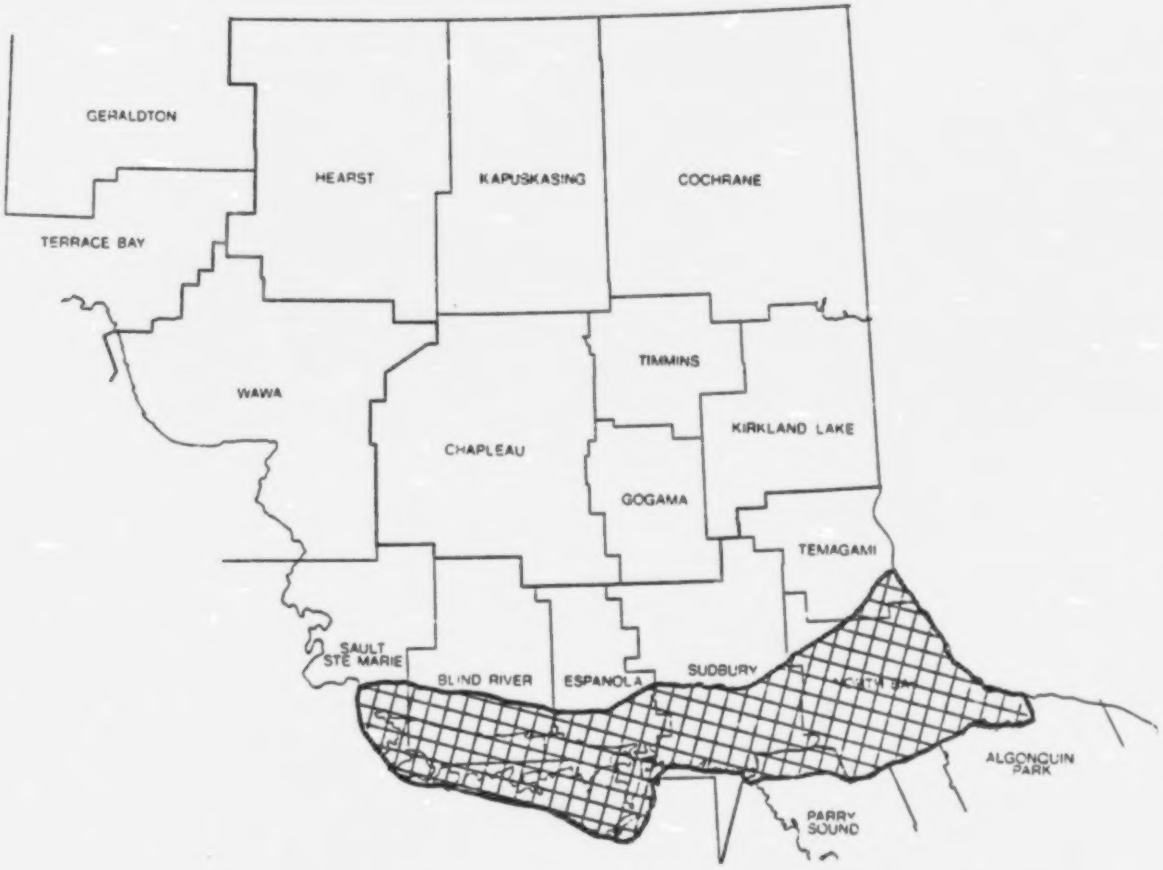
Areas within which defoliation occurred in 1950

LEGEND

Light defoliation ⦶

Moderate-to-severe defoliation ▨

NORTHEASTERN ONTARIO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TEMAGAMI
SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

0 Miles 60
0 Kilometres 96

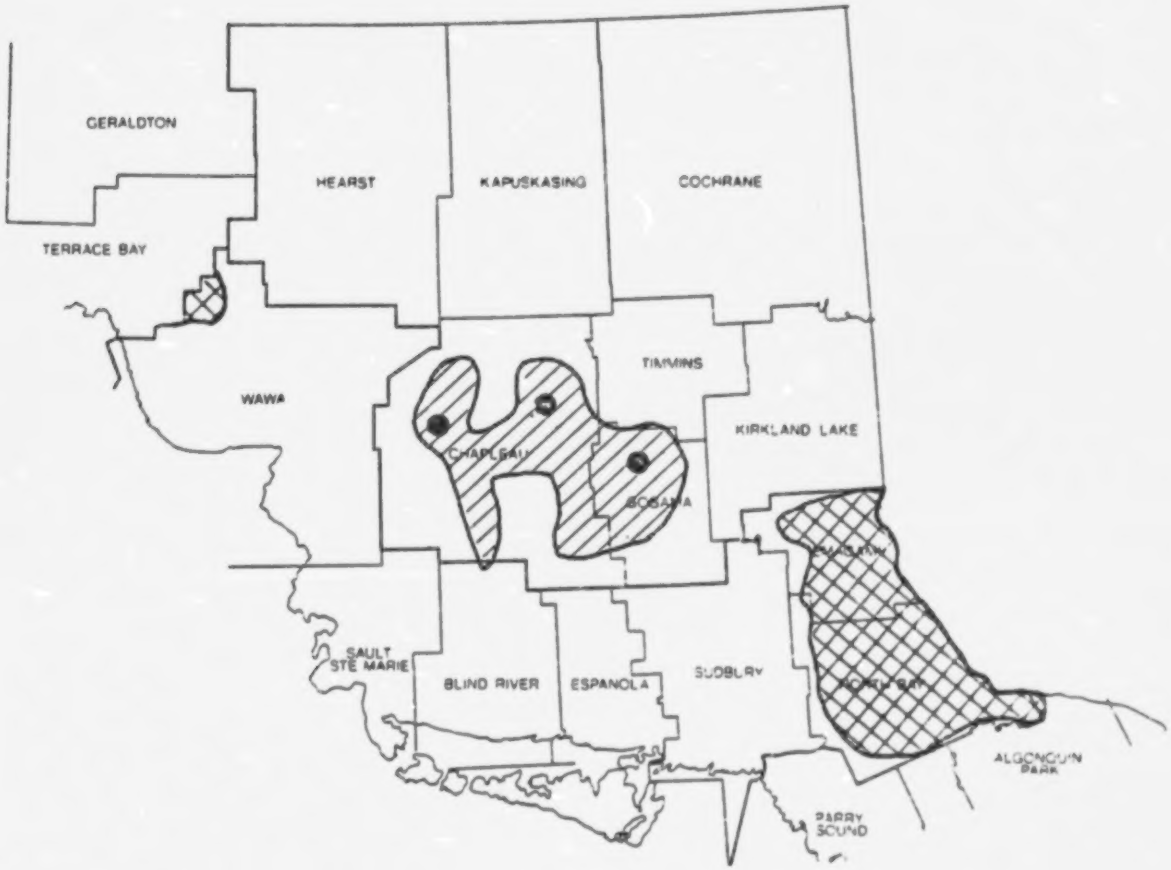
Birch Skeletonizer

Areas within which defoliation occurred in 1961

LEGEND

Moderate-to-severe defoliation ▨

NORTHEASTERN ONTARIO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SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

0 Miles 60

0 Kilometres 96

Birch Skeletonizer

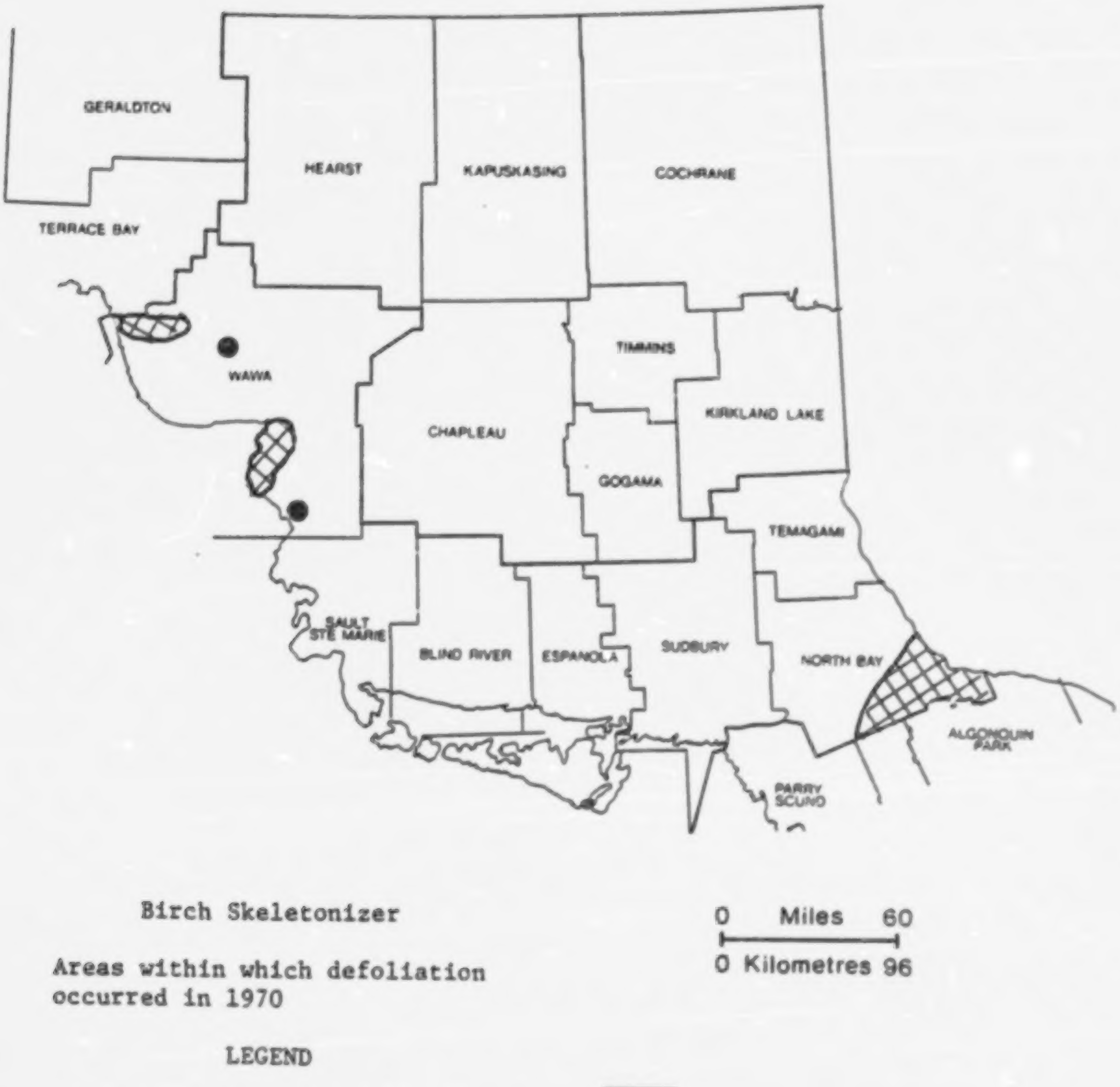
Areas within which defoliation occurred in 1963

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO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CHAPLEAU
GOGAMA
TEMAGAMI
SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Birch Skeletonizer

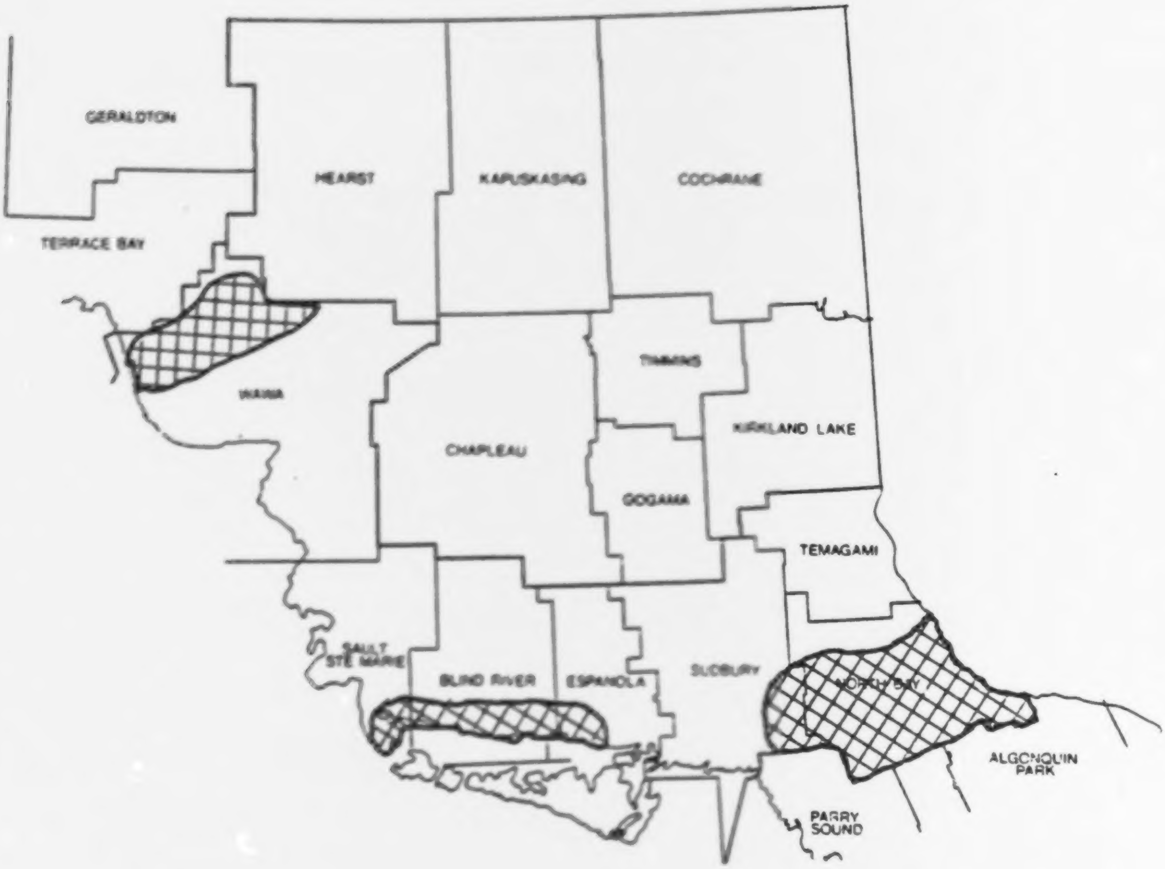
0 Miles 60
0 Kilometres 96

Areas within which defoliation occurred in 1970

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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GOGAMA
TEMAGAMI
SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Birch Skeletonizer

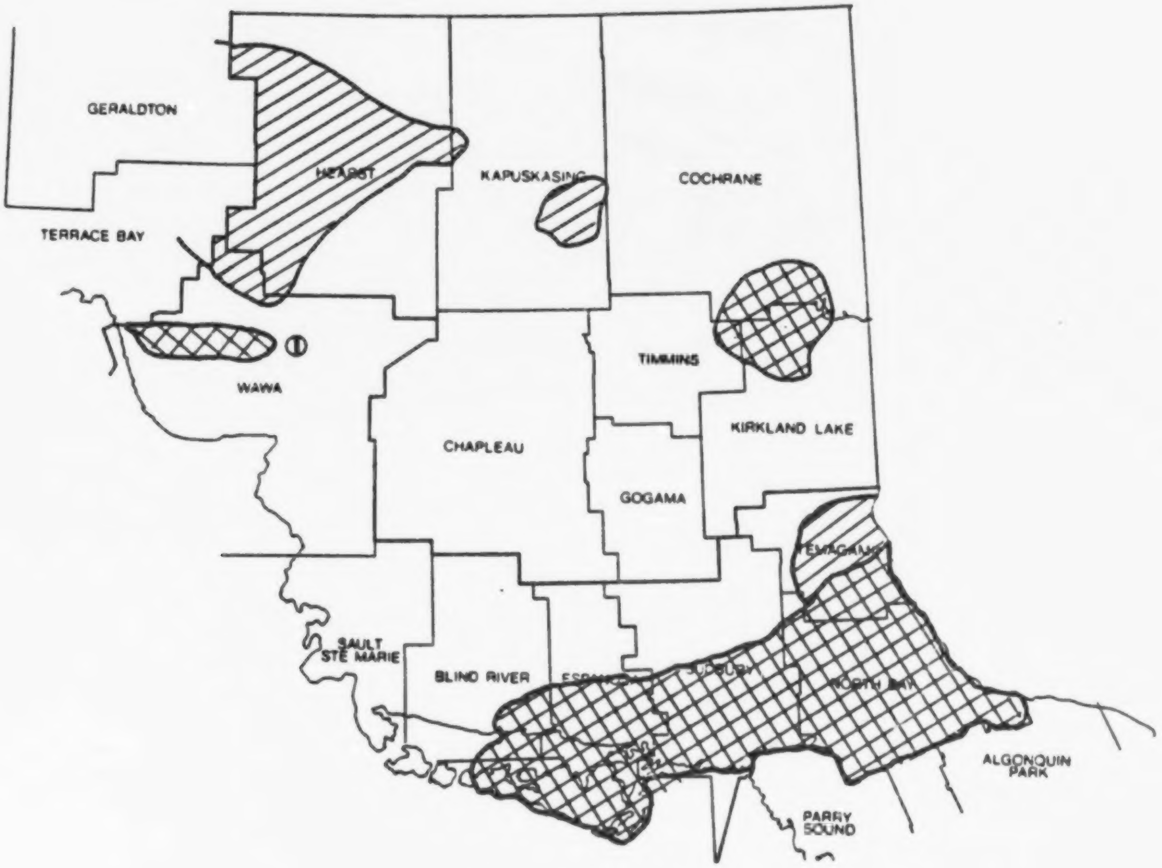
Areas within which defoliation
occurred in 1971

0 Miles 60
0 Kilometres 96

LEGEND

Moderate-to-severe defoliation ▨

NORTHEASTERN ONTARIO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COCHRANE
TERRACE BAY
Ⓘ
WAWA
TIMMINS
KIRKLAND LAKE
CHAPLEAU
GOGAMA
TEMAGAMI
SAULT STE MARIE
BLIND RIVER
ESPAN
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Birch Skeletonizer

0 Miles 60
0 Kilometres 96

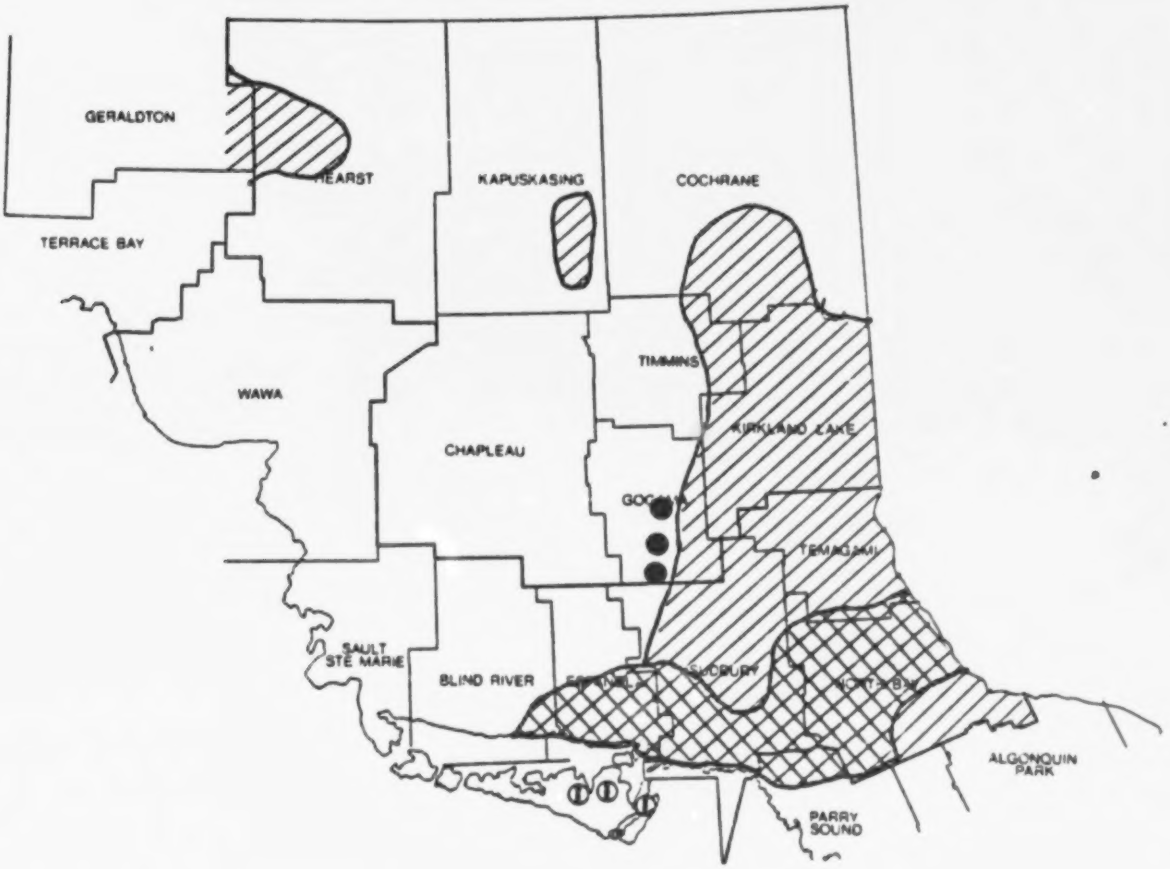
Areas within which defoliation
occurred in 1972

LEGEND

Light defoliation Ⓘ or ▨

Moderate-to-severe defoliation ▩

NORTHEASTERN ONTARIO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TEMAGAMI
SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Birch Skeletonizer

Areas within which defoliation occurred in 1973

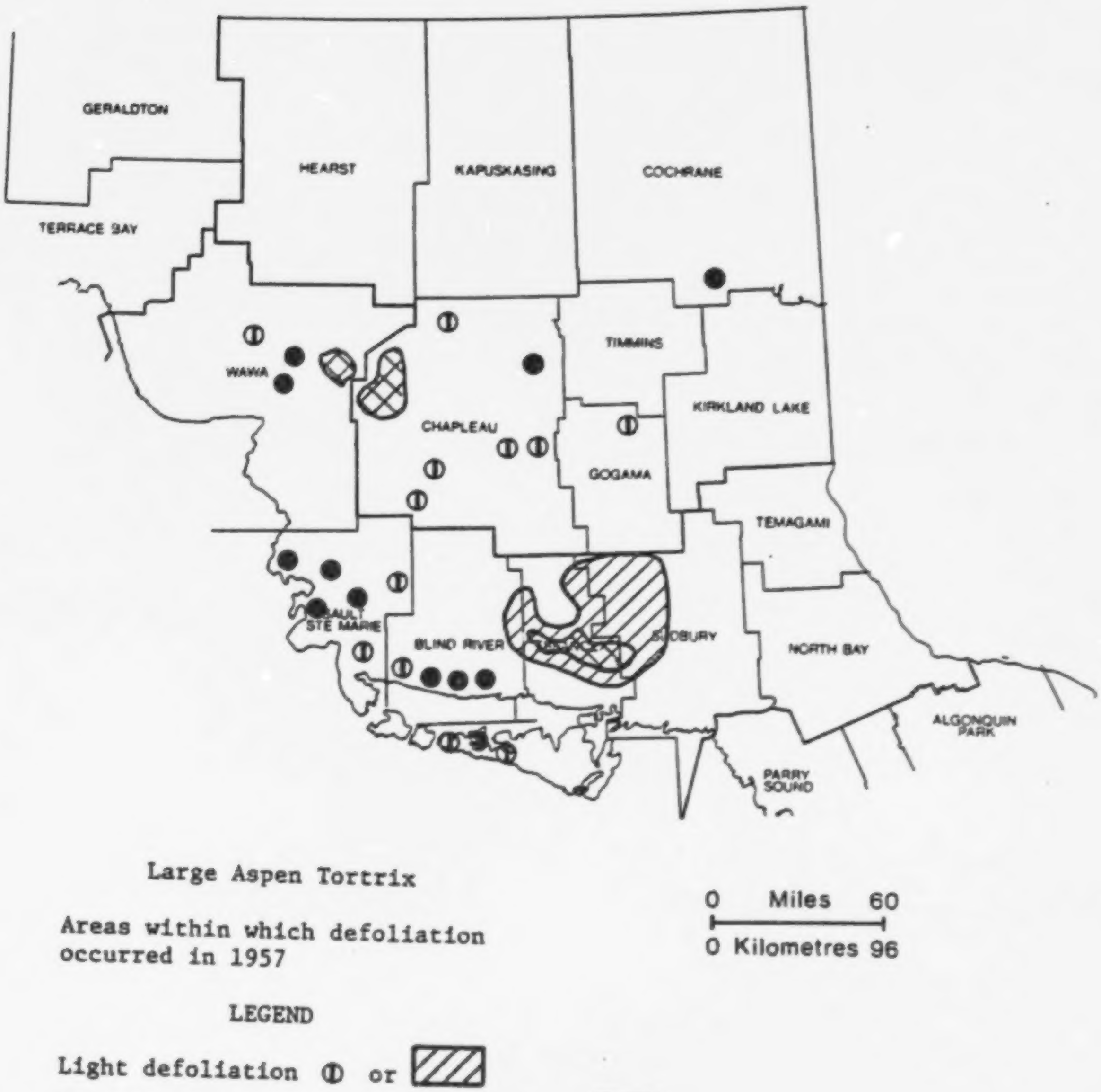
0 Miles 60
0 Kilometres 96

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO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SAULT STE MARIE
BLIND RIVER
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Large Aspen Tortrix

Areas within which defoliation
occurred in 1957

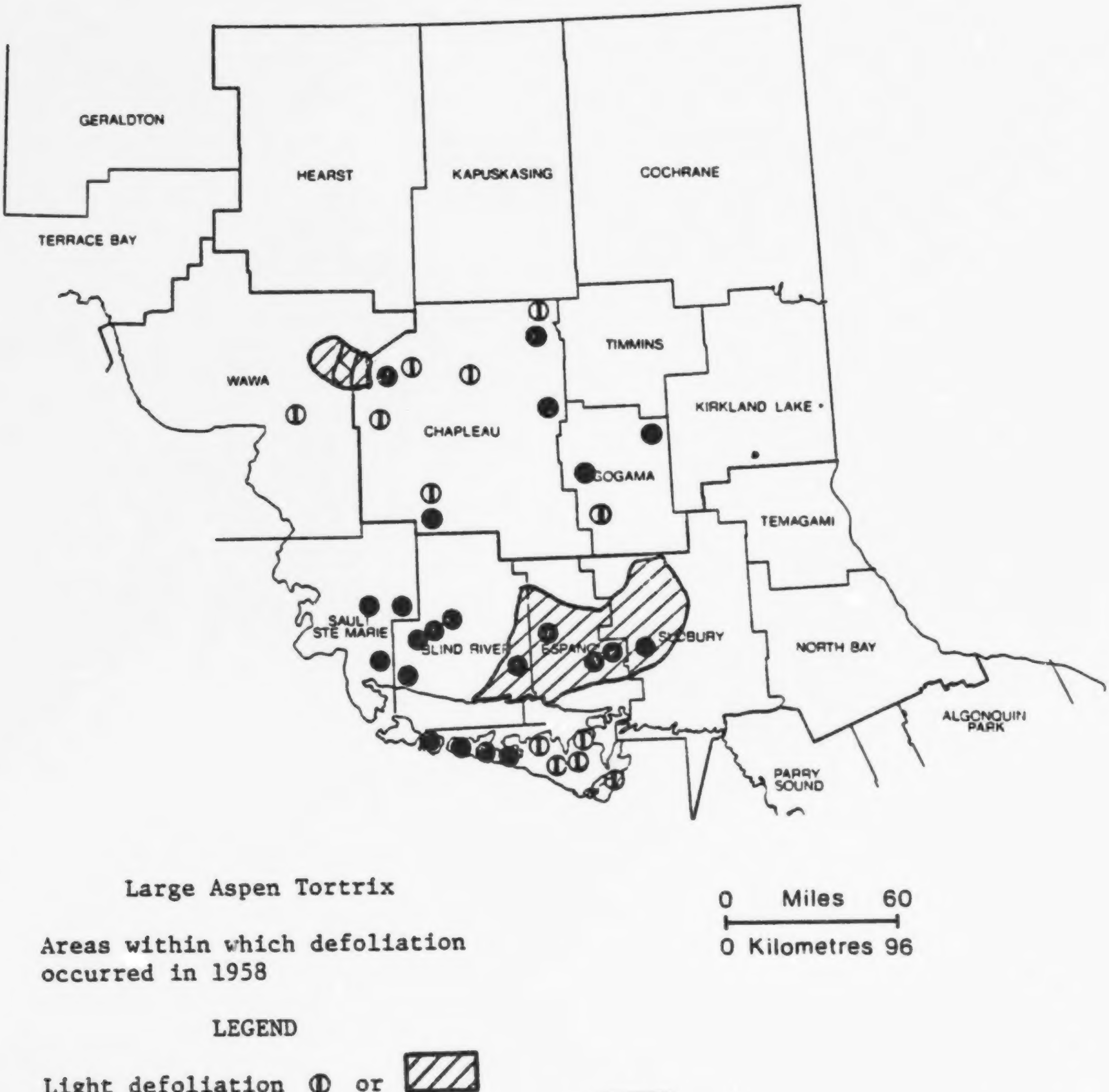
0 Miles 60
0 Kilometres 96

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO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SAULT STE MARIE
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SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Large Aspen Tortrix

0 Miles 60
0 Kilometres 96

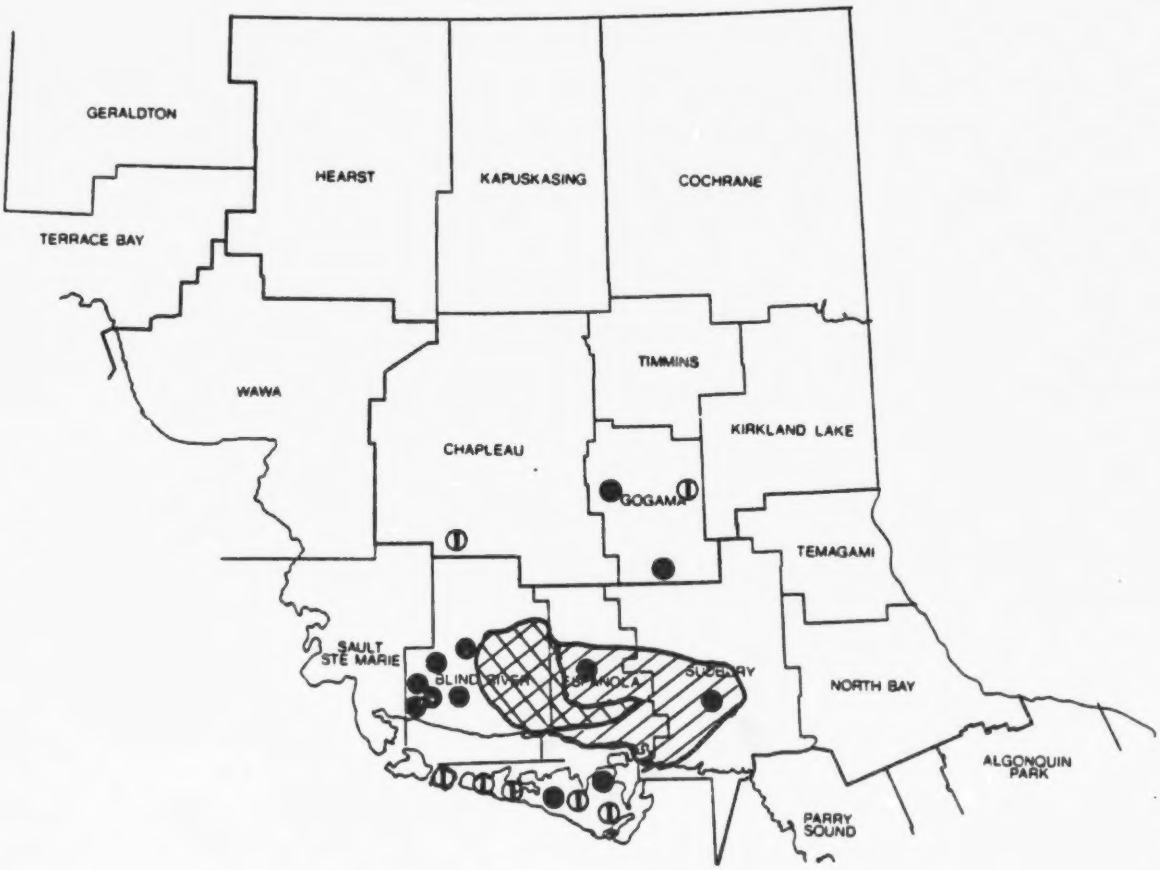
Areas within which defoliation occurred in 1958

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO



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ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Large Aspen Tortrix

Areas within which defoliation occurred in 1959

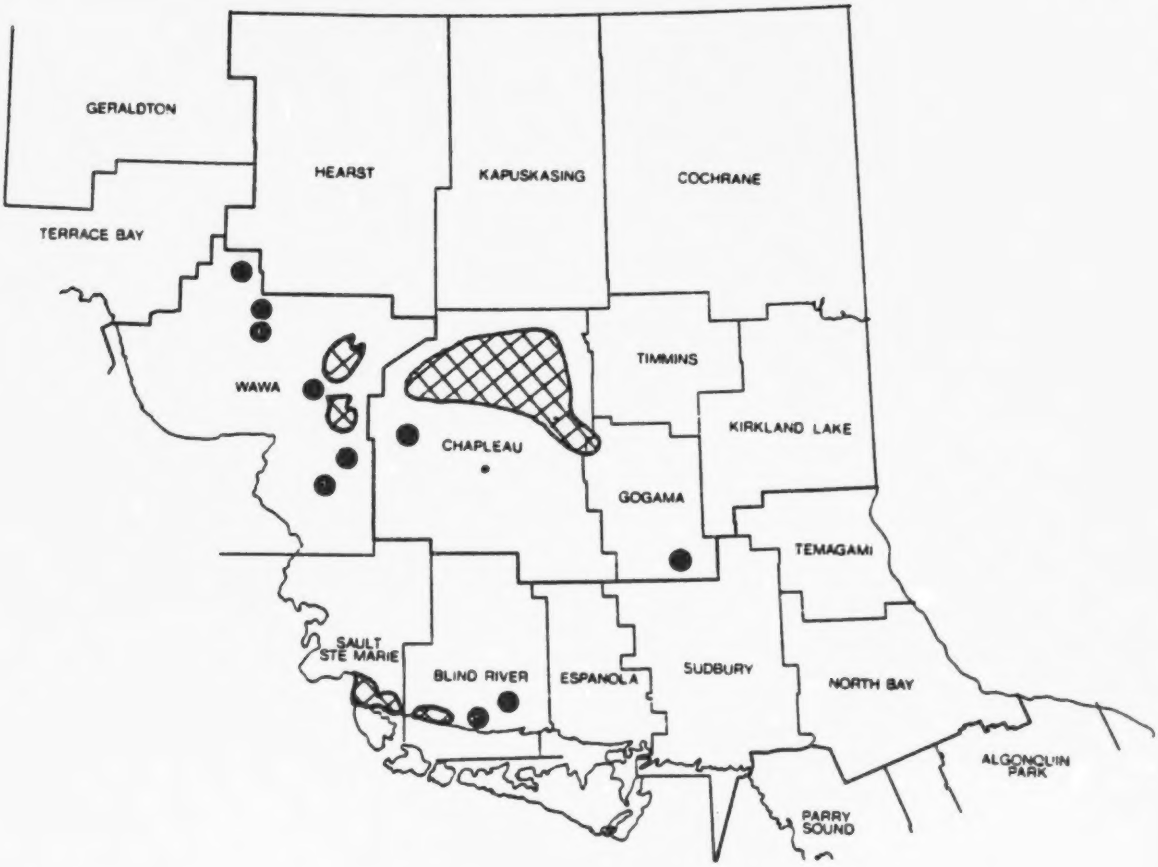
0 Miles 60
0 Kilometres 96

LEGEND

Light defoliation ◑ or ▨

Moderate-to-severe defoliation ● or ▦

NORTHEASTERN ONTARIO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SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

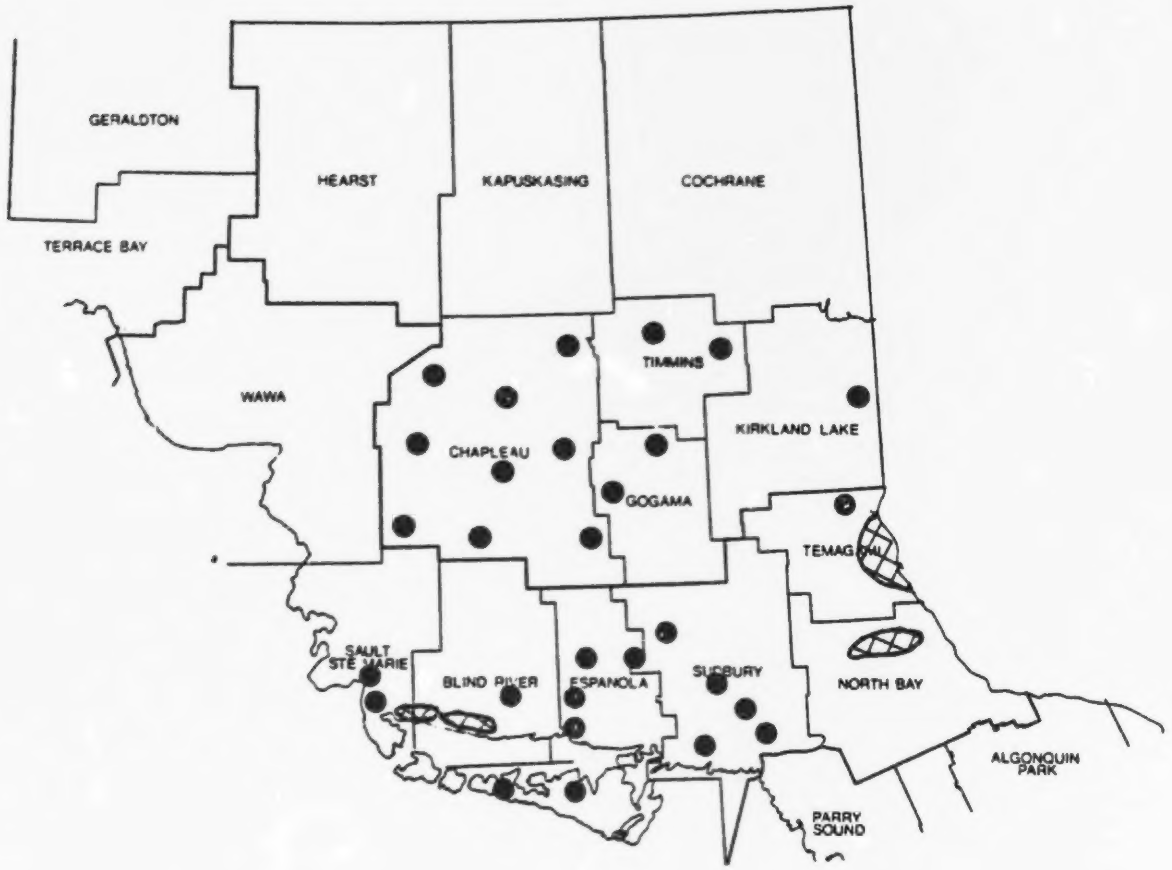
Large Aspen Tortrix

Areas within which defoliation occurred in 1970

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Large Aspen Tortrix

Areas within which defoliation occurred in 1971

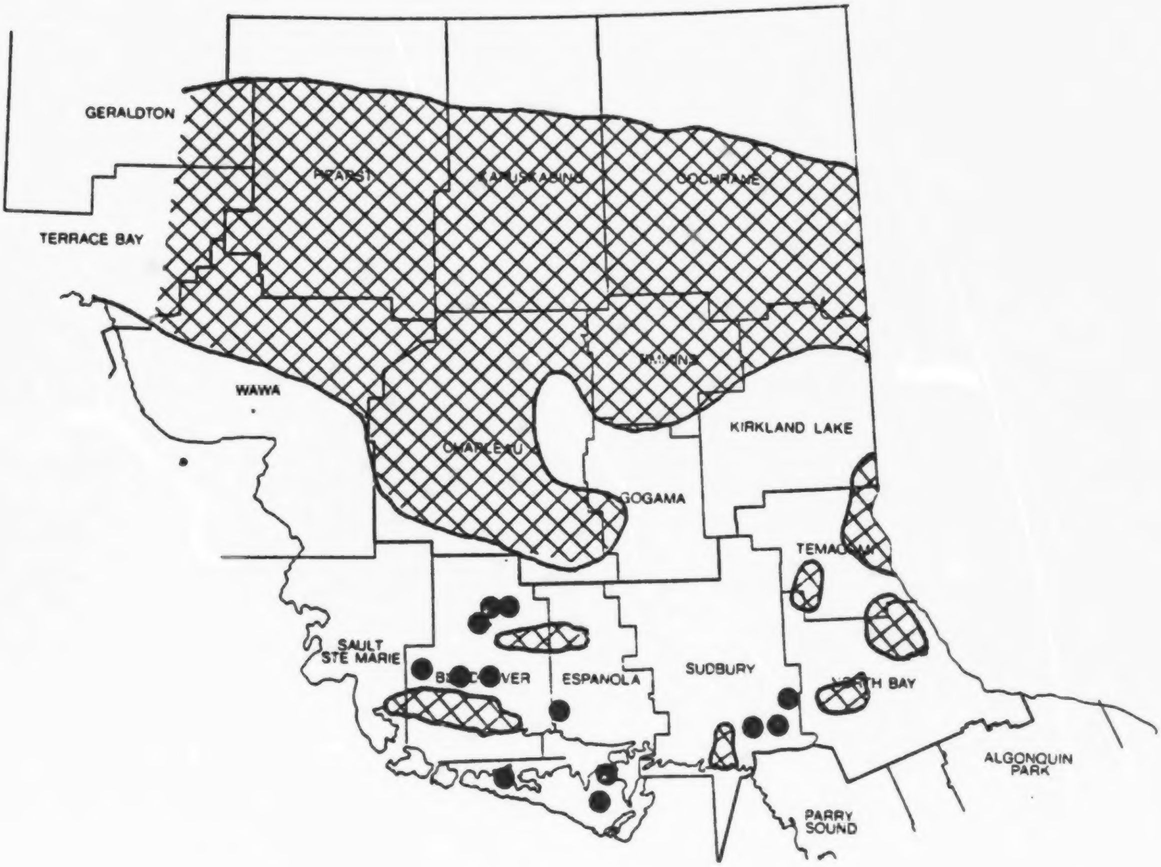
0 Miles 60

0 Kilometres 96

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

0 Miles 60

0 Kilometres 96

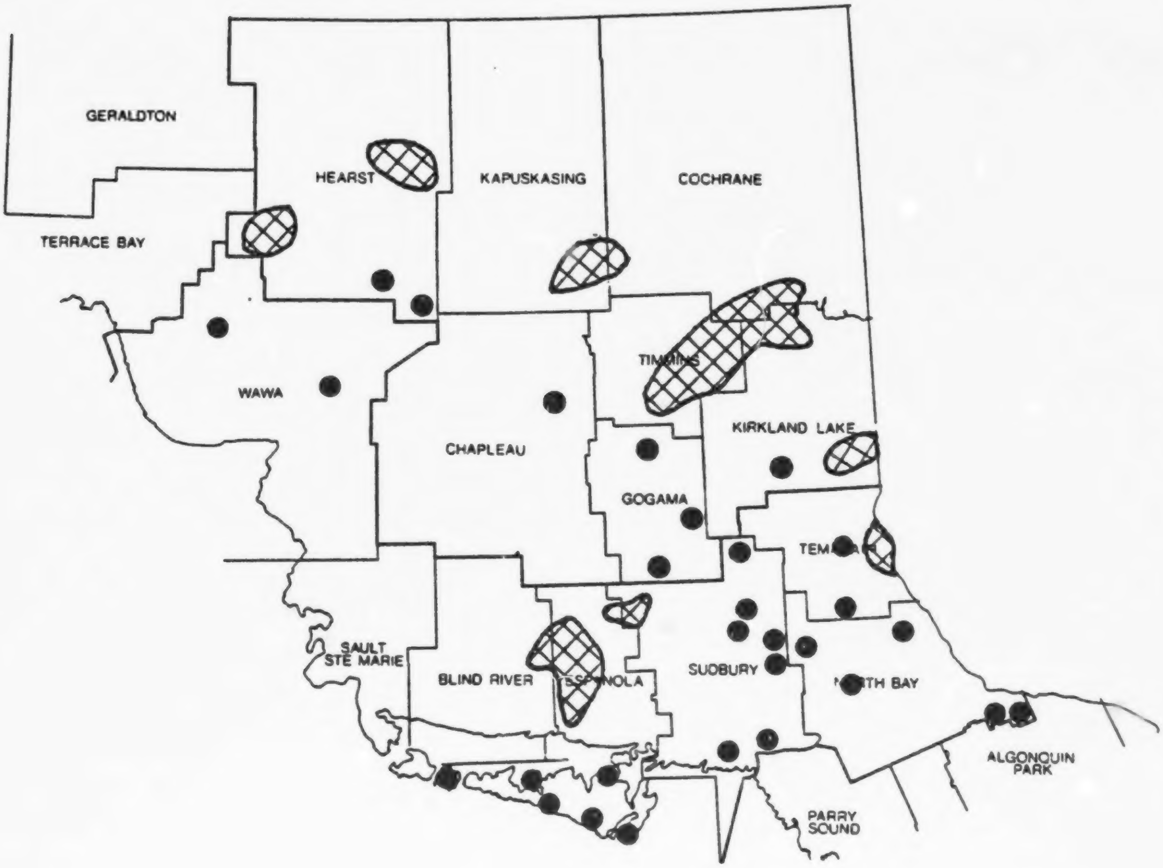
Large Aspen Tortrix

Areas within which defoliation
occurred in 1972

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Large Aspen Tortrix

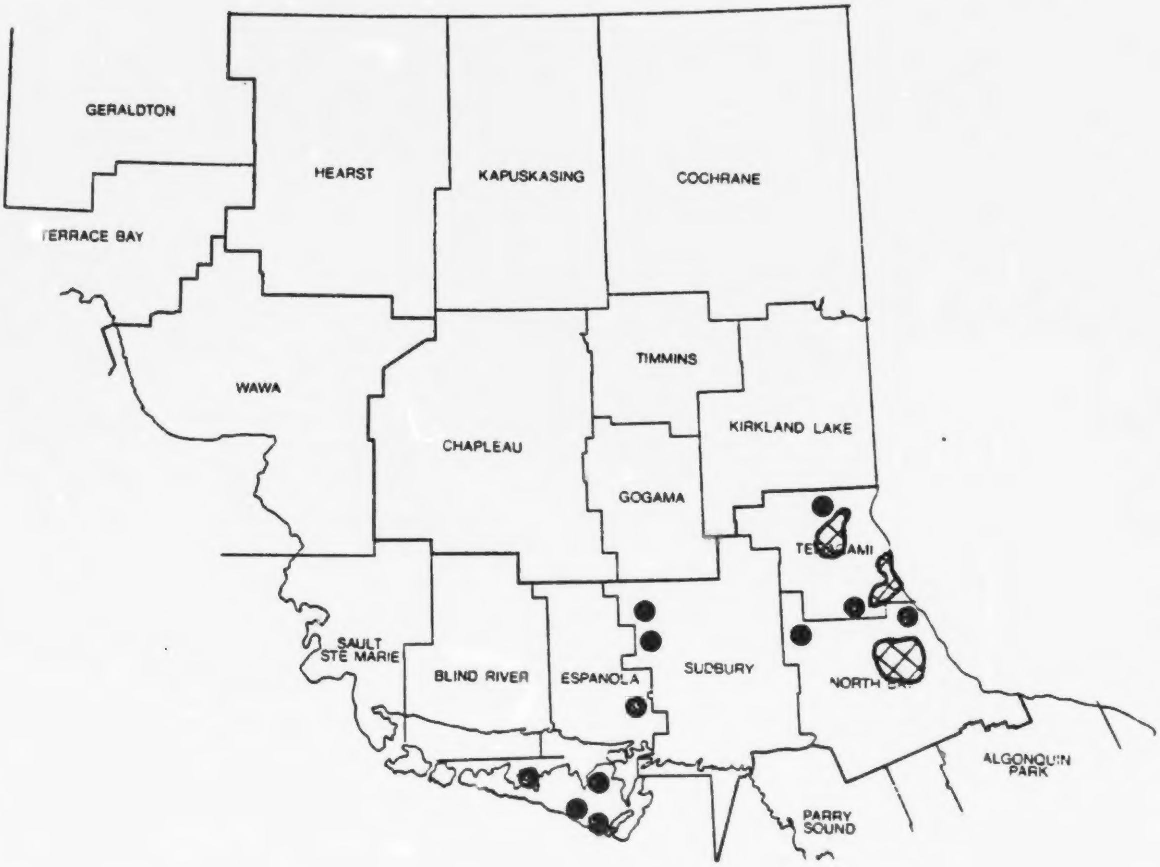
Areas within which defoliation occurred in 1973

0 Miles 60
0 Kilometres 96

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

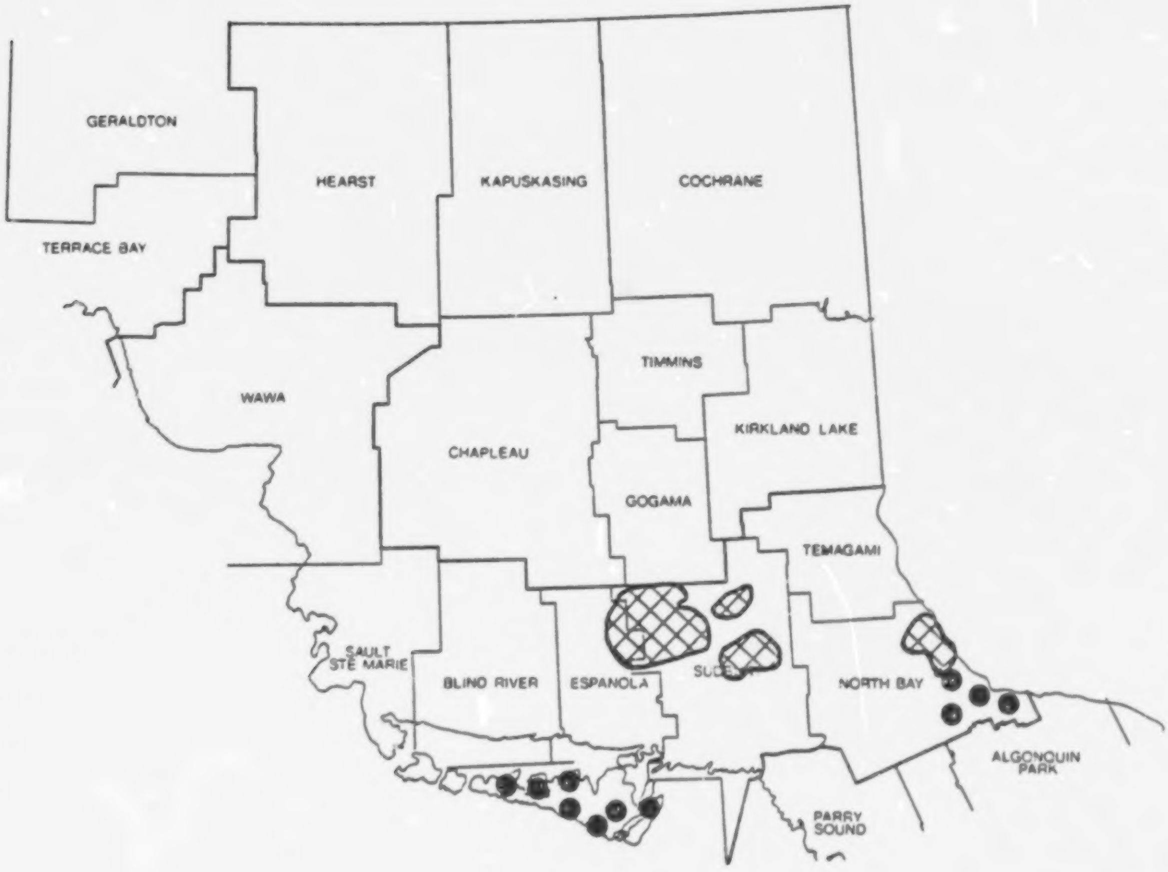
Large Aspen Tortrix

Areas within which defoliation occurred in 1974

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Large Aspen Tortrix

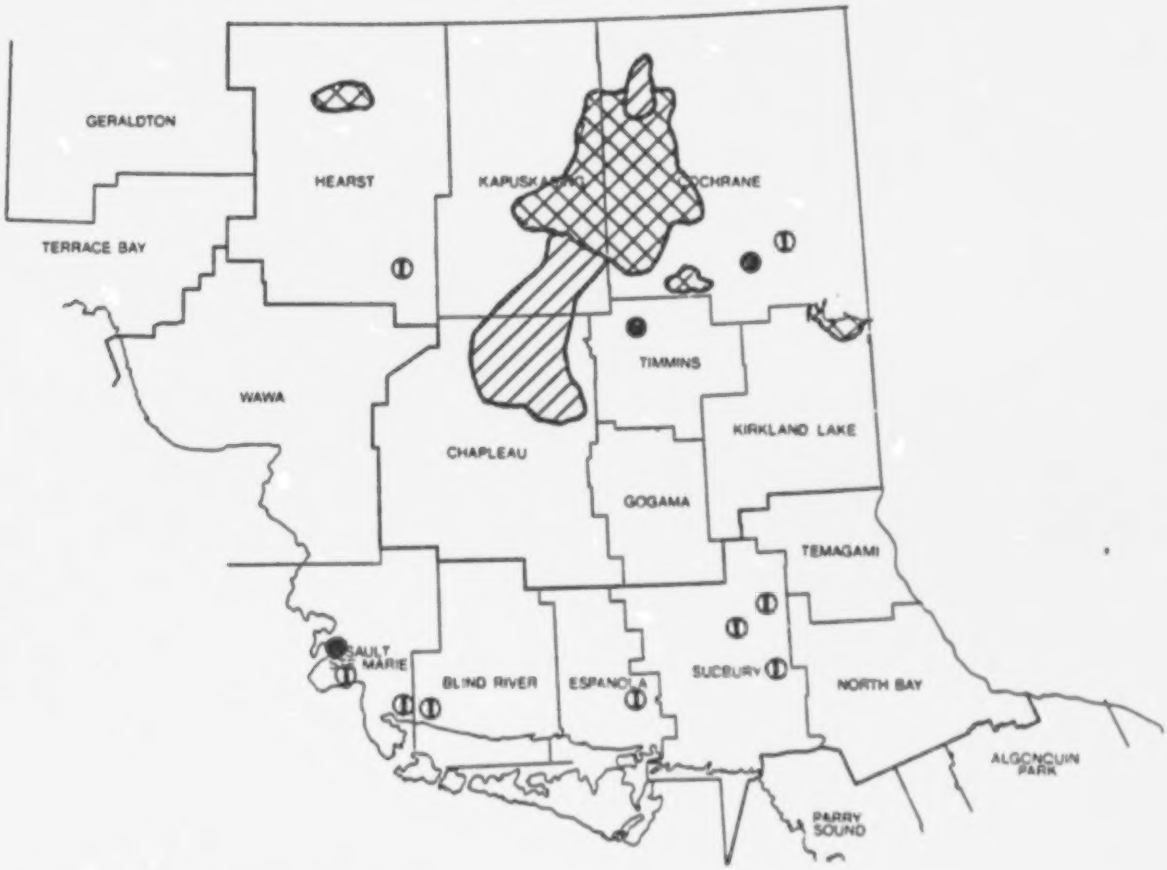
Areas within which defoliation occurred in 1975

0 Miles 60
0 Kilometres 96

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



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MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Spruce Budworm

Areas within which defoliation occurred in 1950

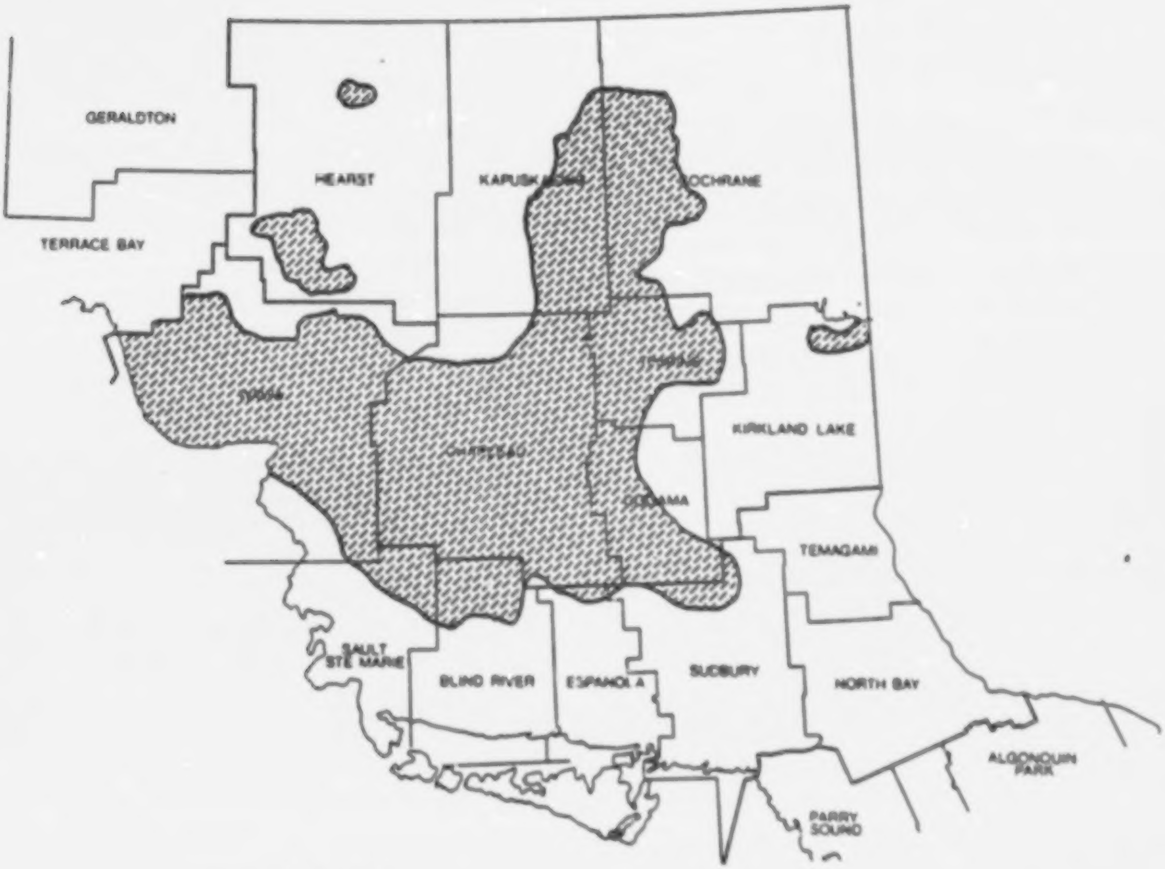
0 Miles 60
0 Kilometres 96

LEGEND

Light defoliation ⦶ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO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SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Spruce Budworm

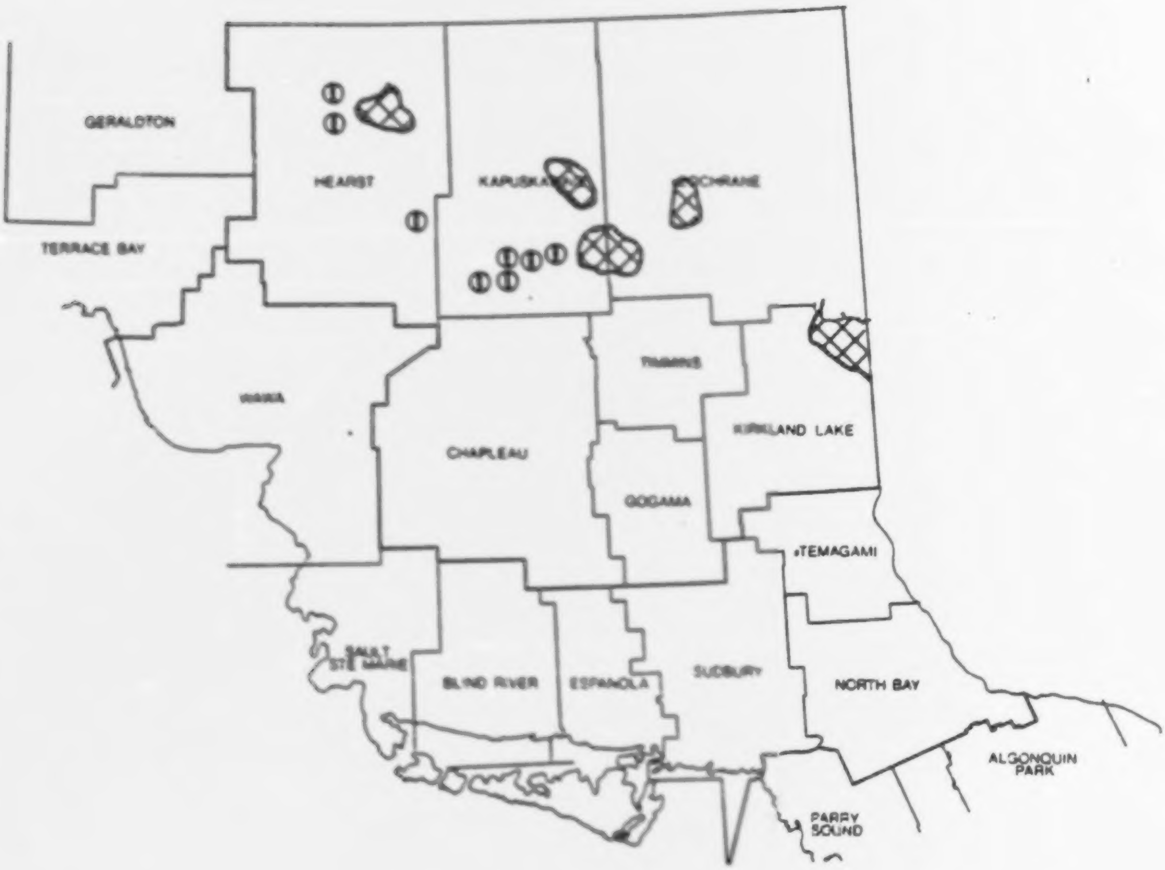
Areas within which balsam fir
whole tree and top mortality
occurred in 1950

0 Miles 60
0 Kilometres 96

LEGEND

Mortality ▨

NORTHEASTERN ONTARIO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BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Spruce Budworm

0 Miles 60
0 Kilometres 96

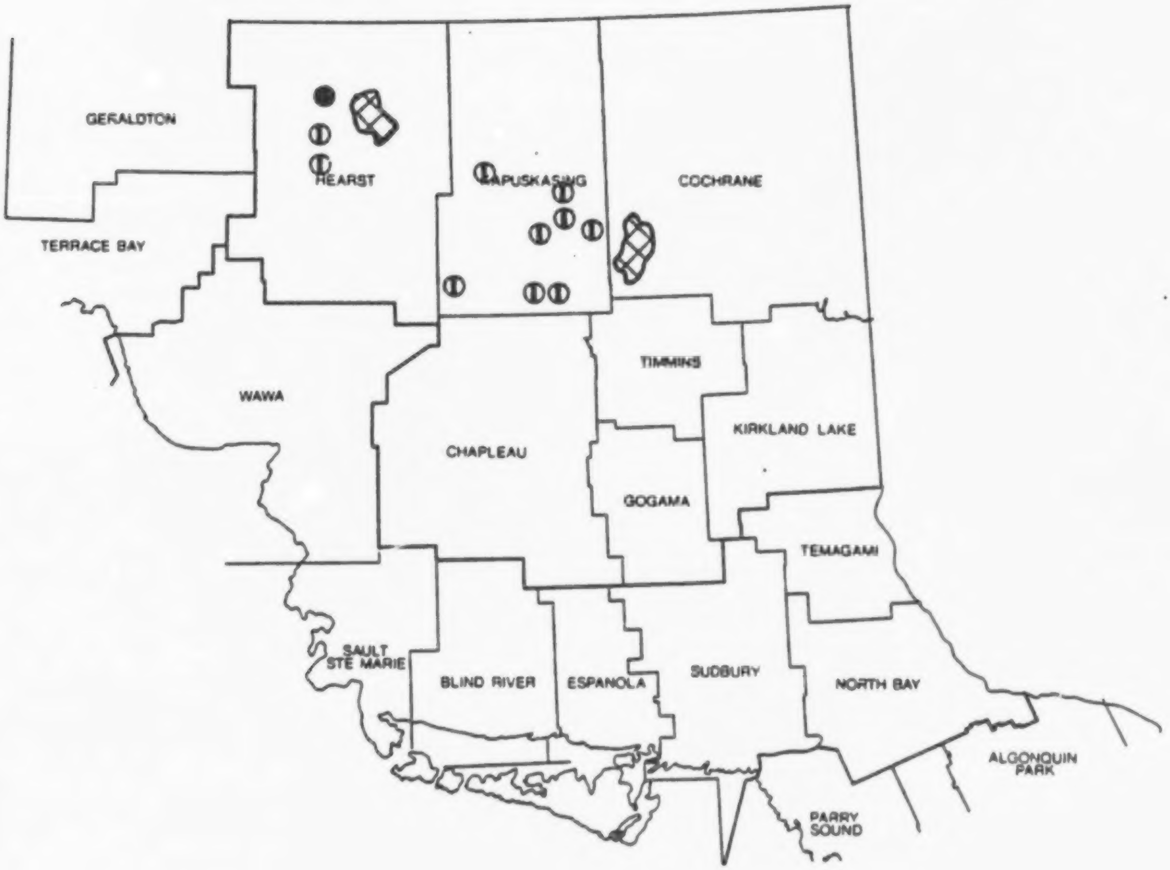
Areas within which defoliation occurred in 1951

LEGEND

Light defoliation ⦶

Moderate-to-severe defoliation ▨

NORTHEASTERN ONTARIO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BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

0 Miles 60

0 Kilometres 96

Spruce Budworm

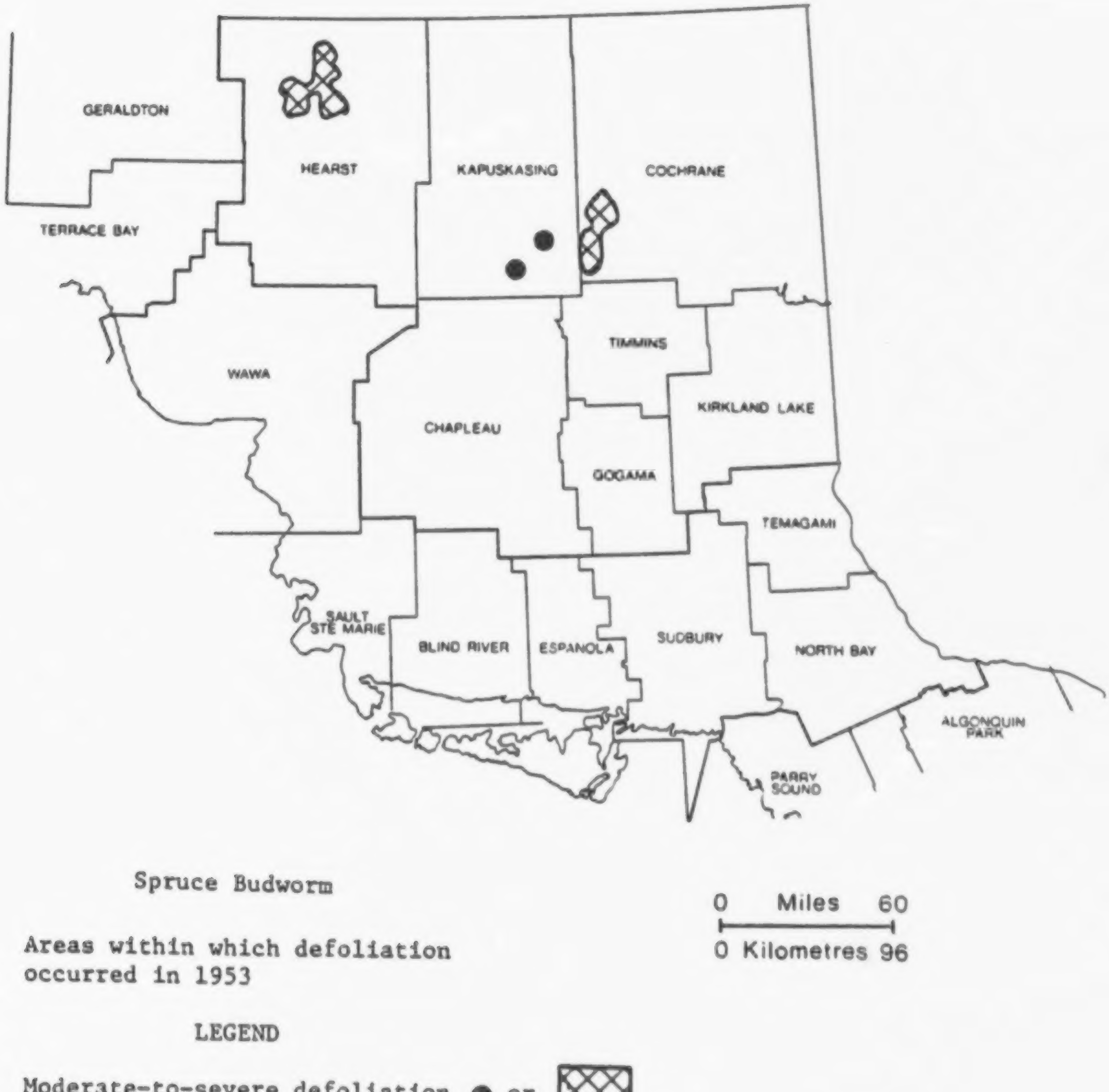
Areas within which defoliation
occurred in 1952

LEGEND

Light defoliation ⦶

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO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ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Spruce Budworm

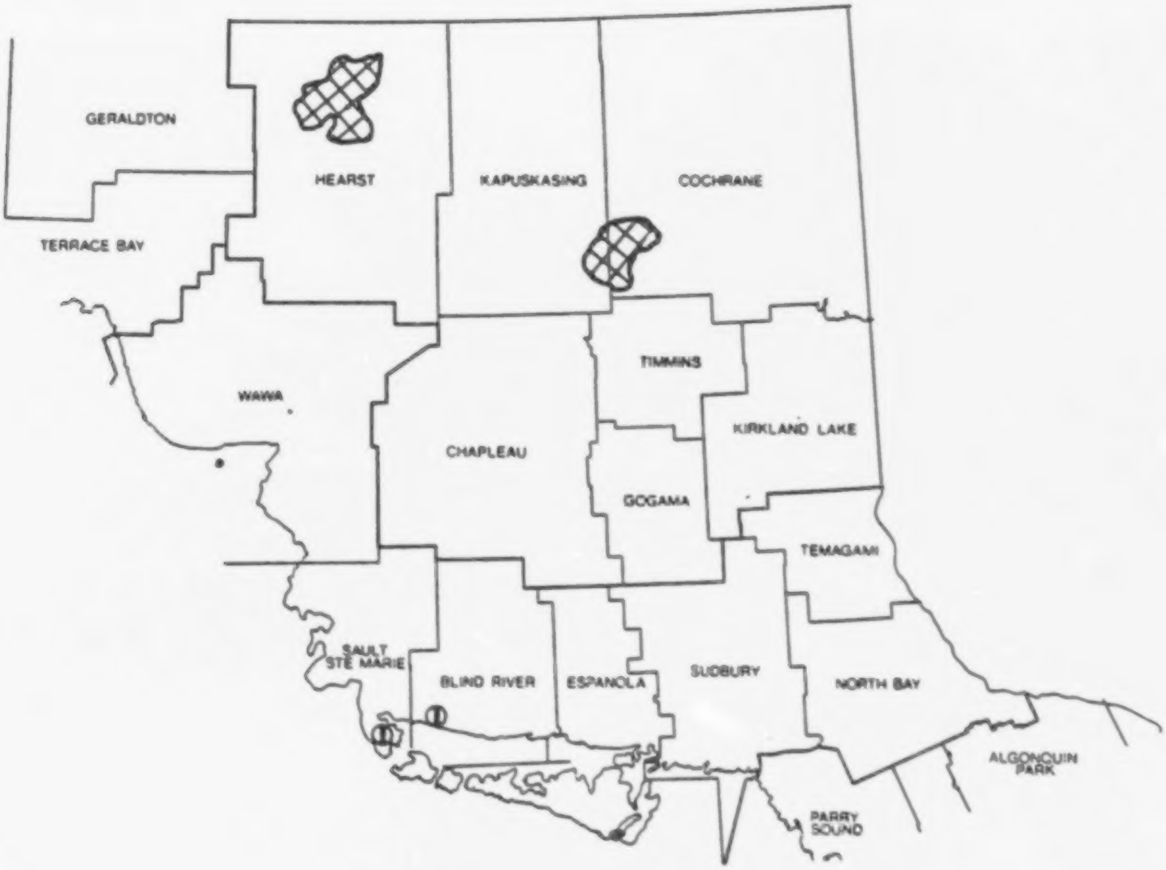
Areas within which defoliation occurred in 1953

0 Miles 60
0 Kilometres 96

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

Spruce Budworm

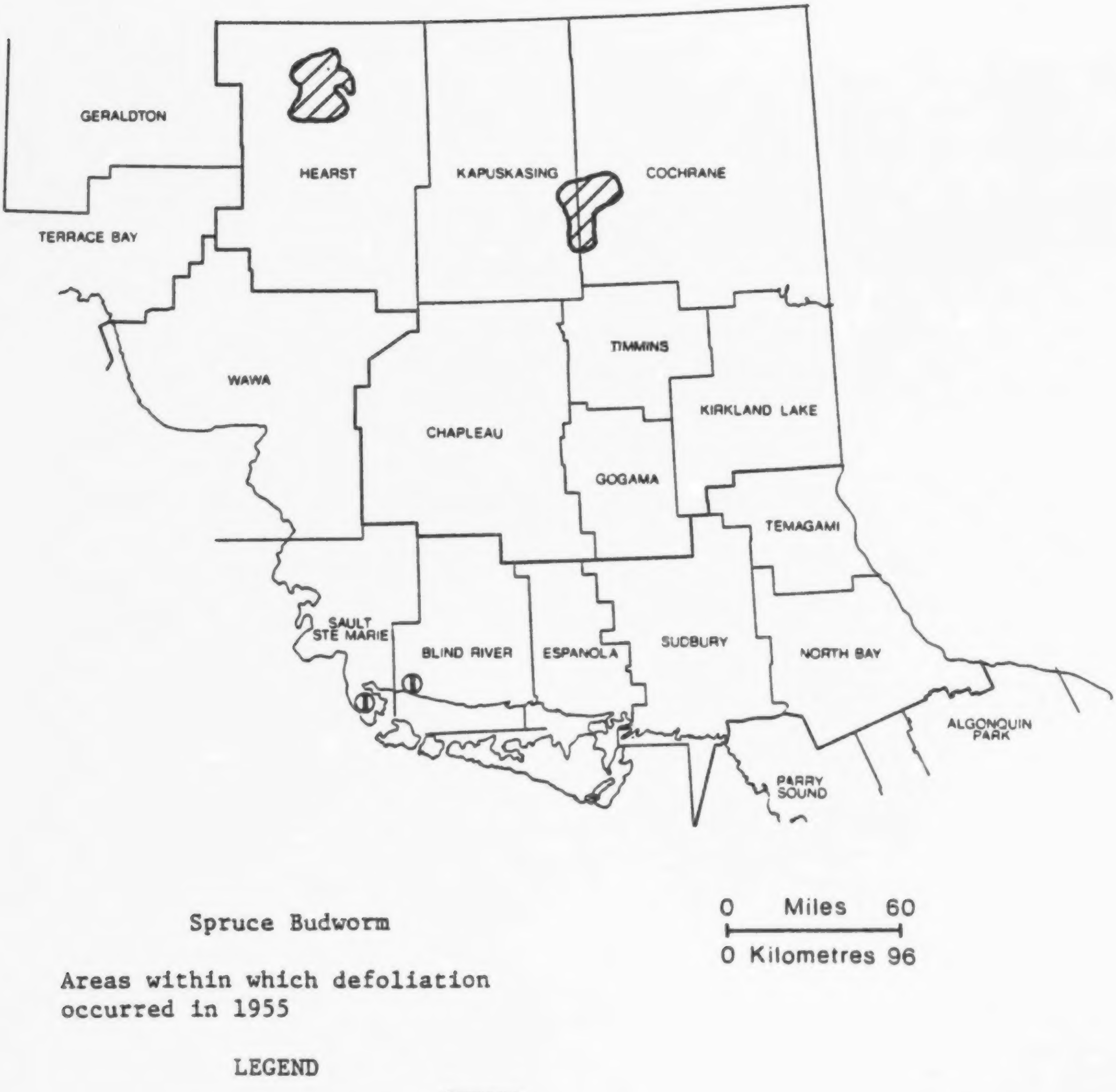
Areas within which defoliation
occurred in 1954

LEGEND

Light defoliation ⦶

Moderate-to-severe defoliation ▨

NORTHEASTERN ONTARIO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SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

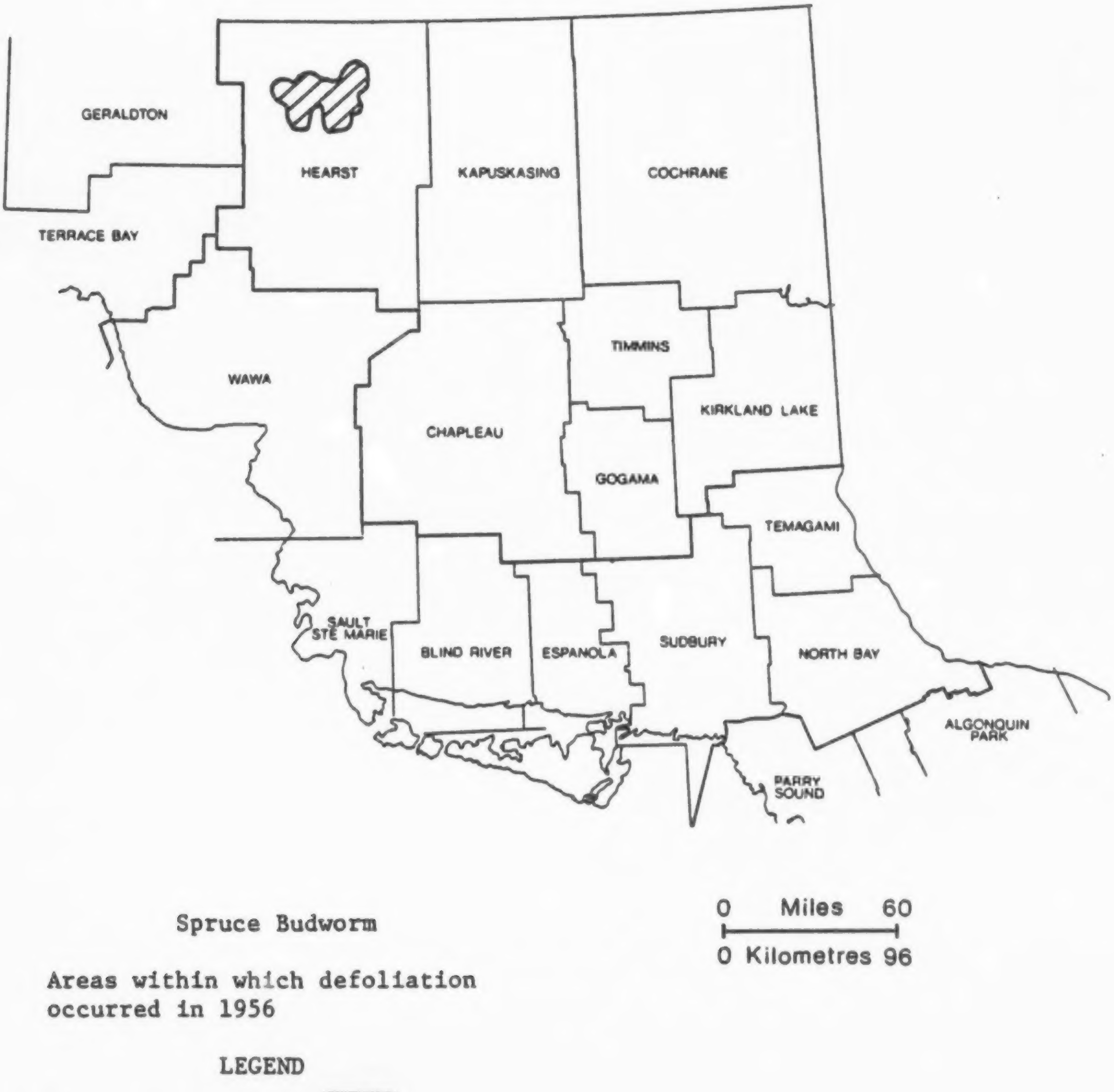
Spruce Budworm

Areas within which defoliation
occurred in 1955

LEGEND

Light defoliation ⦶ or ▨

NORTHEASTERN ONTARIO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BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

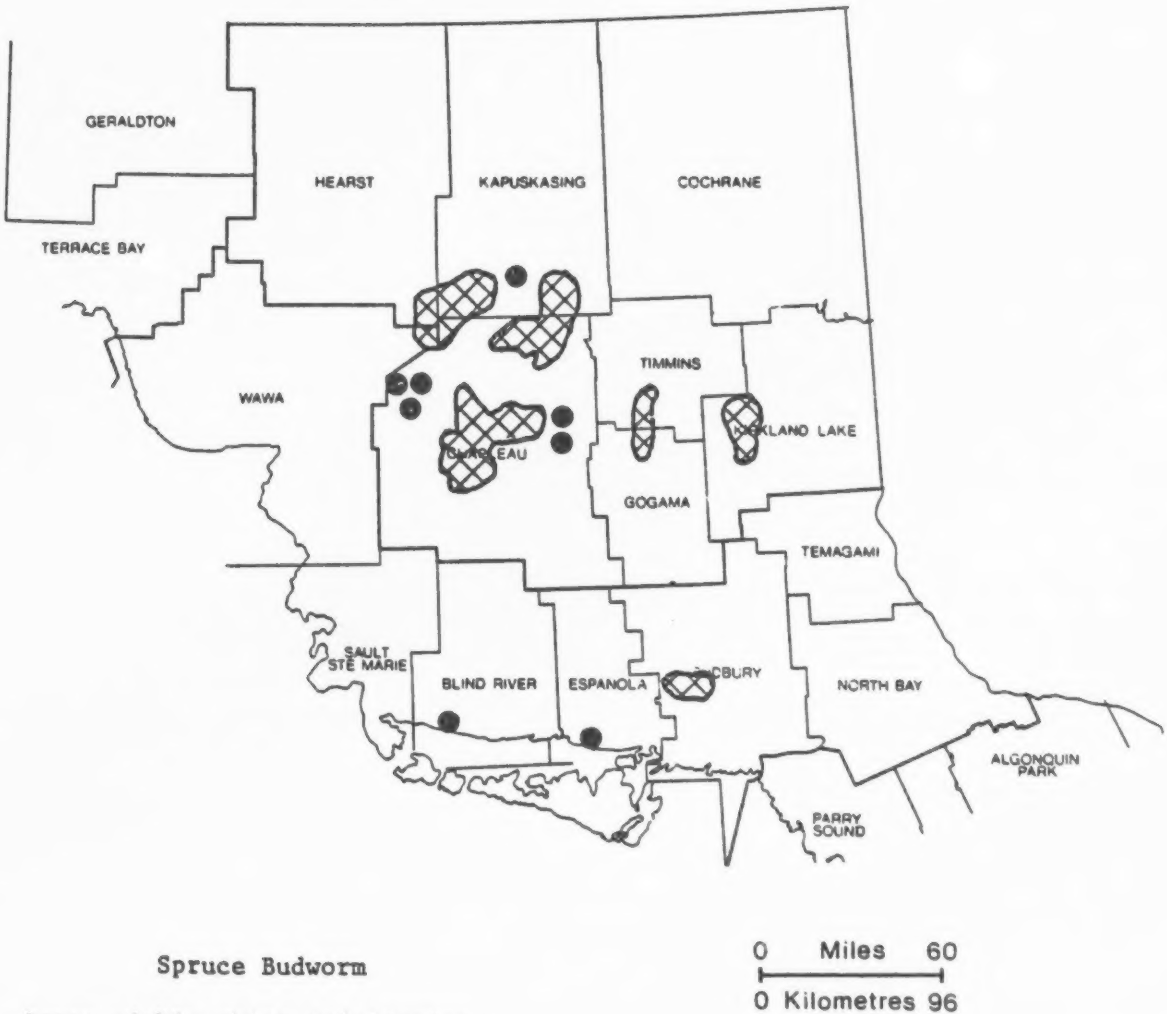
Spruce Budworm

Areas within which defoliation occurred in 1956

LEGEND

Light defoliation ▨

NORTHEASTERN ONTARIO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BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

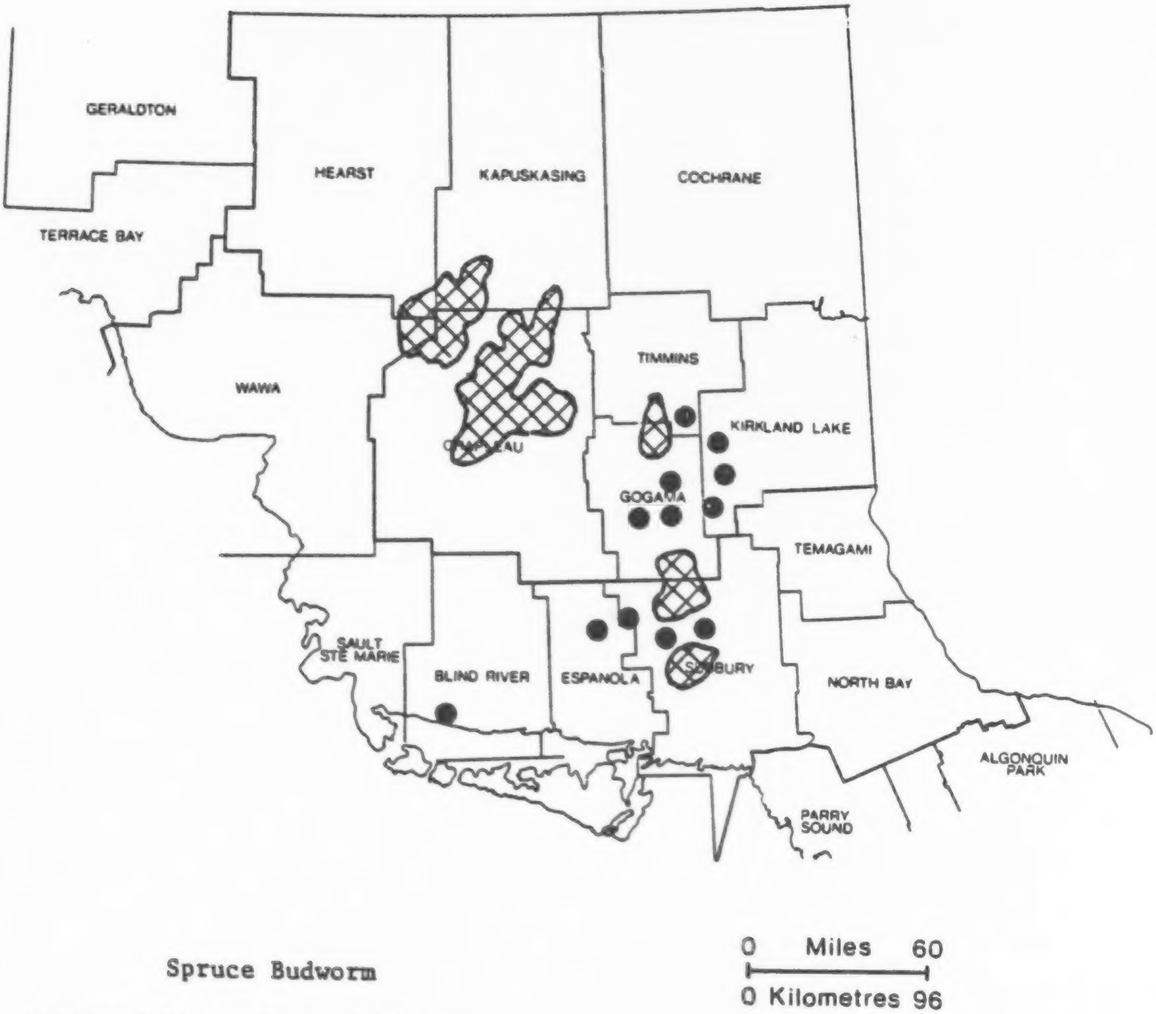
Spruce Budworm

Areas within which defoliation occurred in 1968

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

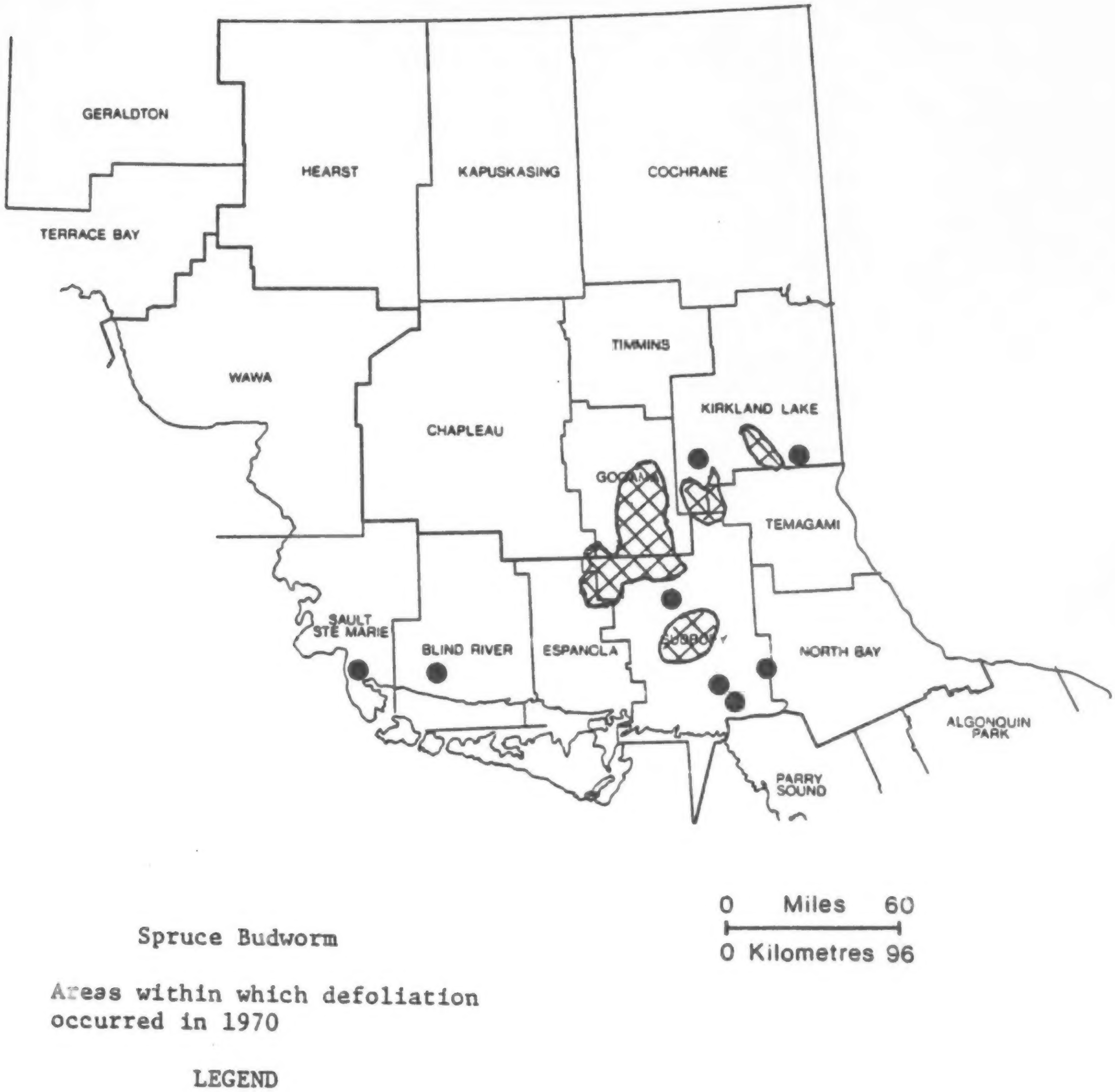
Spruce Budworm

Areas within which defoliation occurred in 1969

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

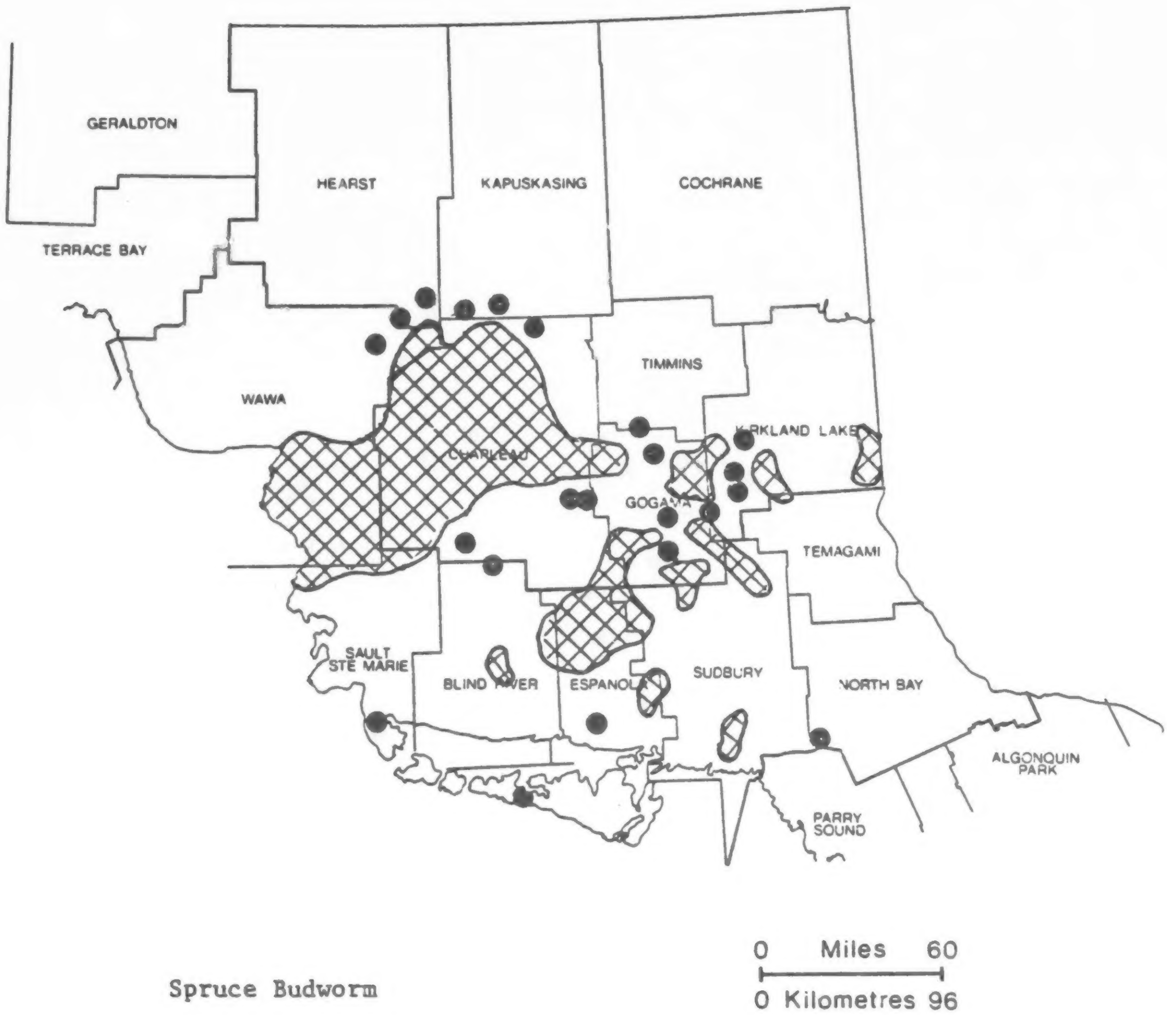
Spruce Budworm

Areas within which defoliation occurred in 1970

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

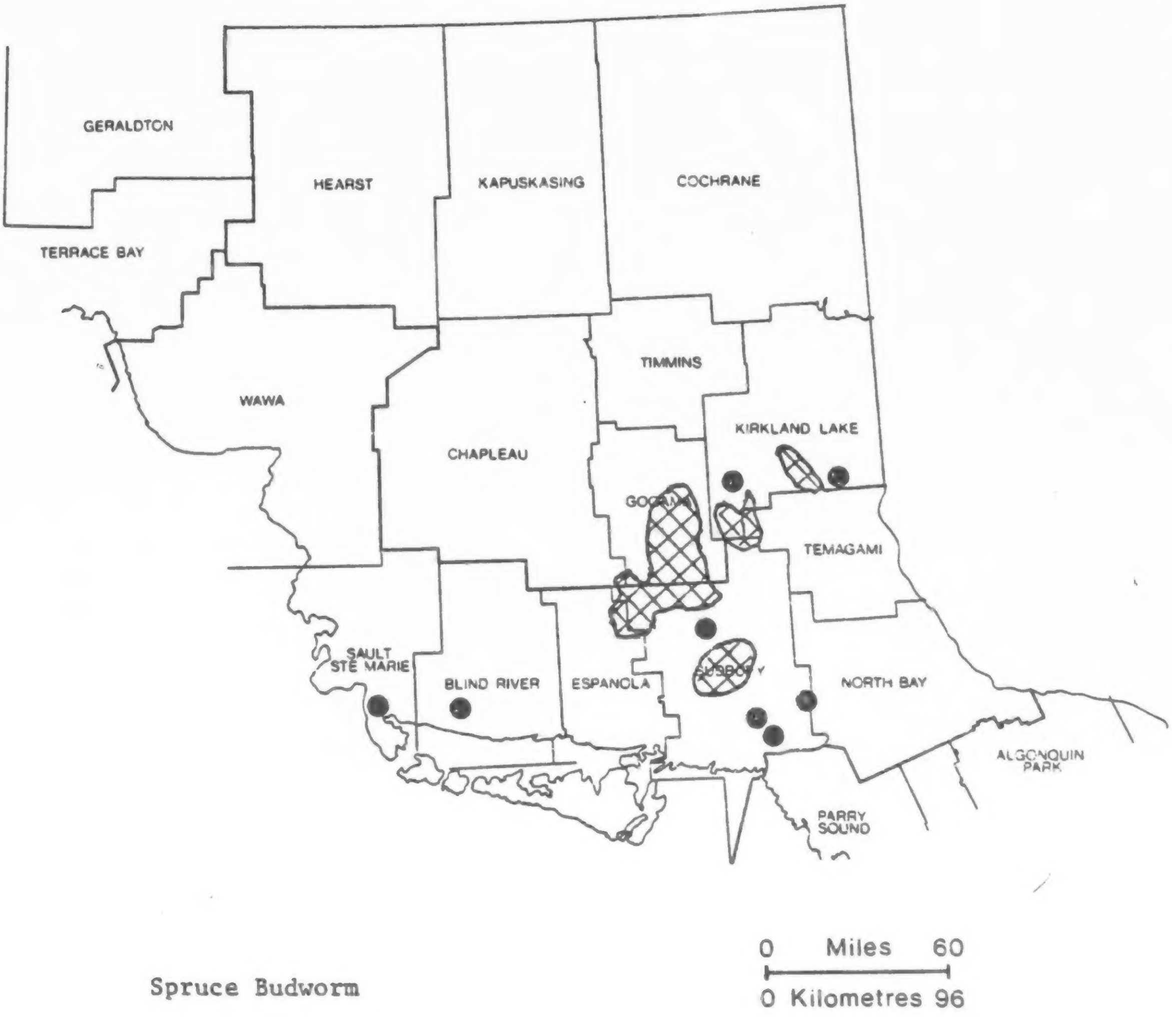
Spruce Budworm

Areas within which defoliation occurred in 1971

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

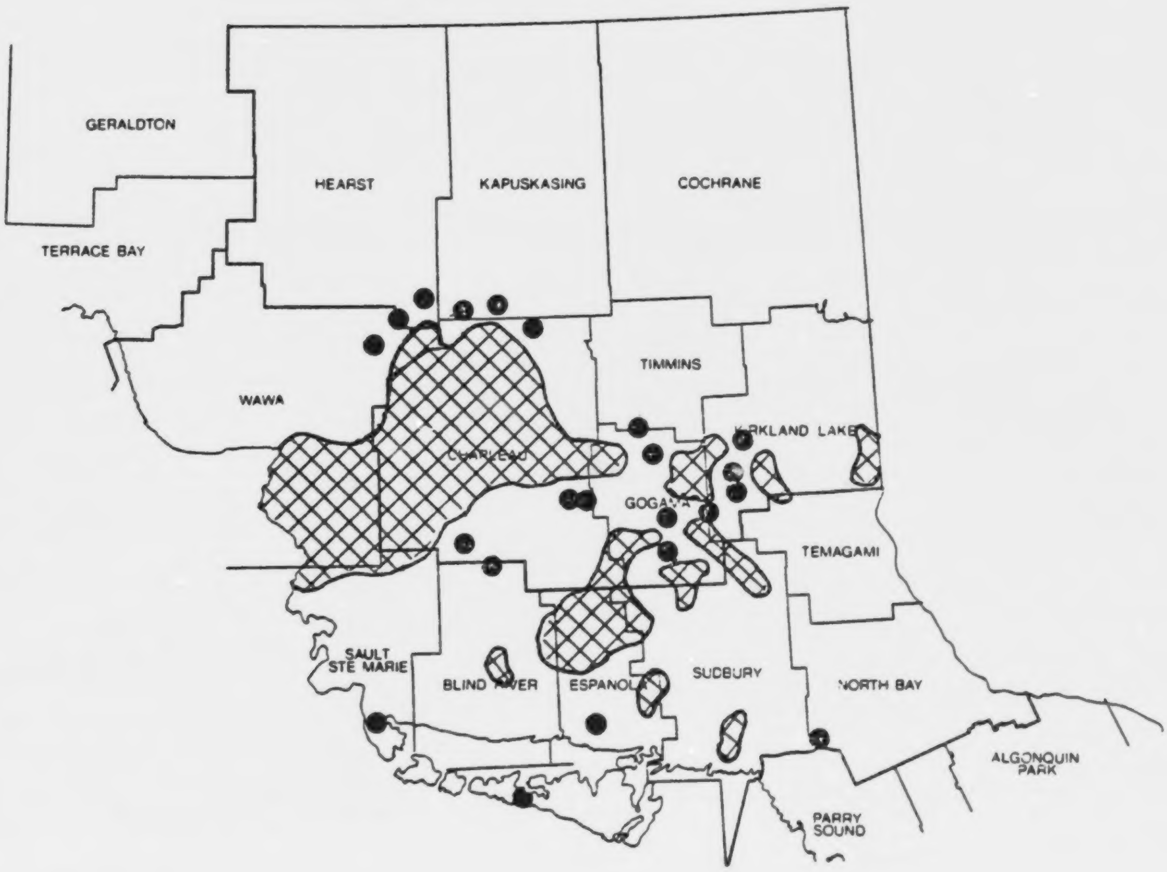
Spruce Budworm

Areas within which defoliation
occurred in 1970

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

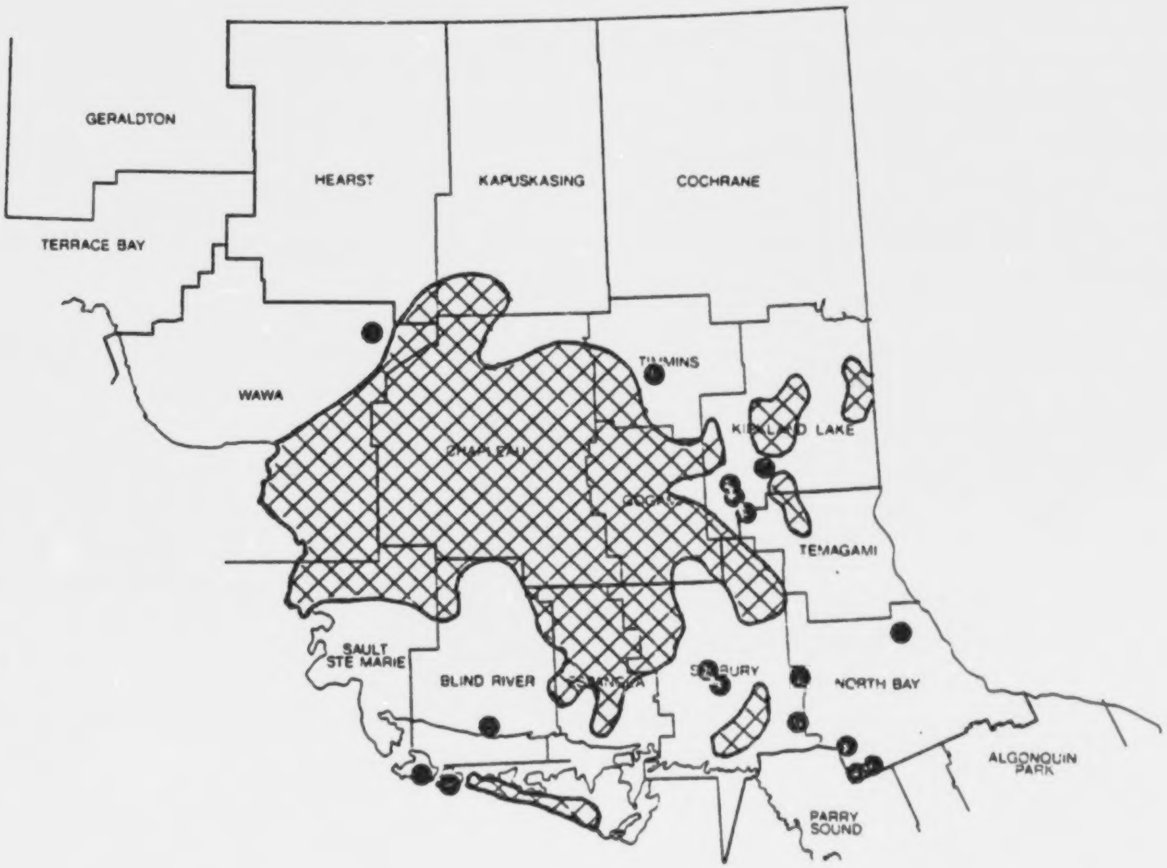
Spruce Budworm

Areas within which defoliation occurred in 1971

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

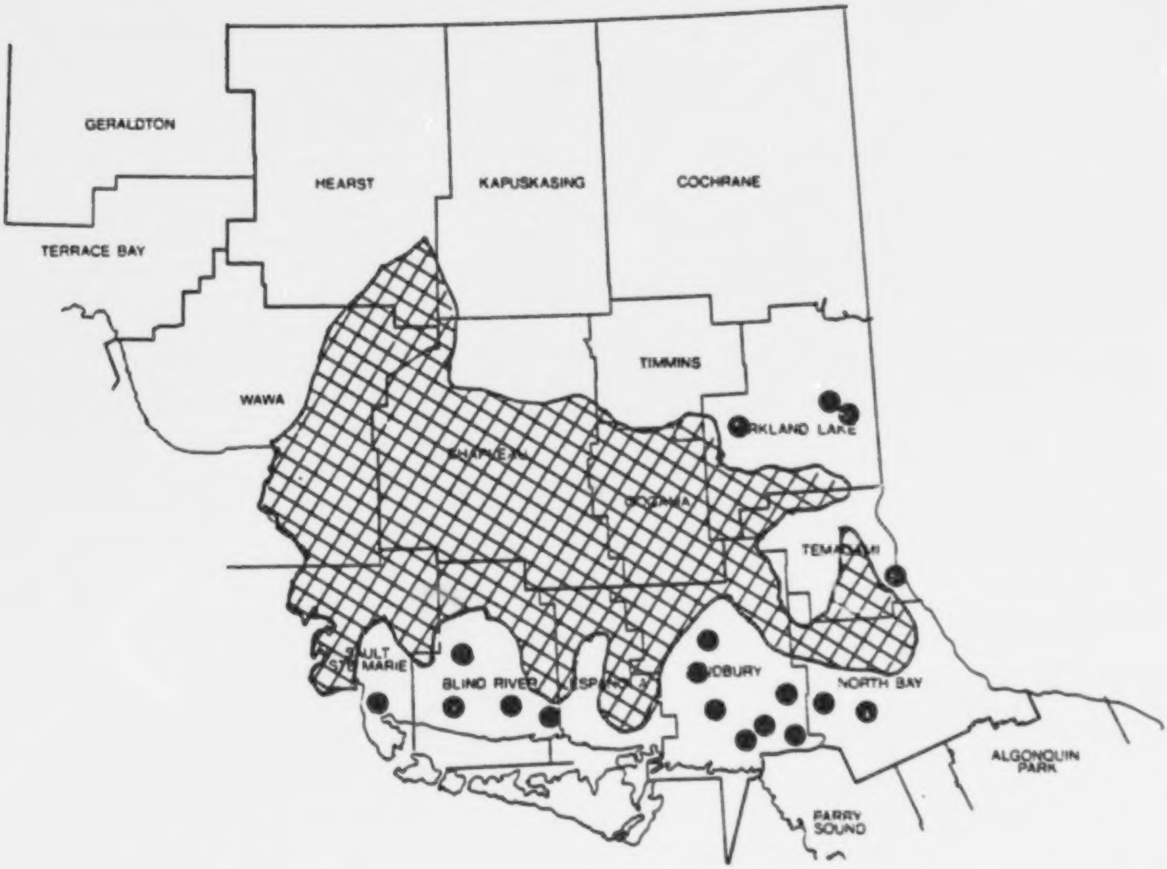
Spruce Budworm

Areas within which defoliation occurred in 1972

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

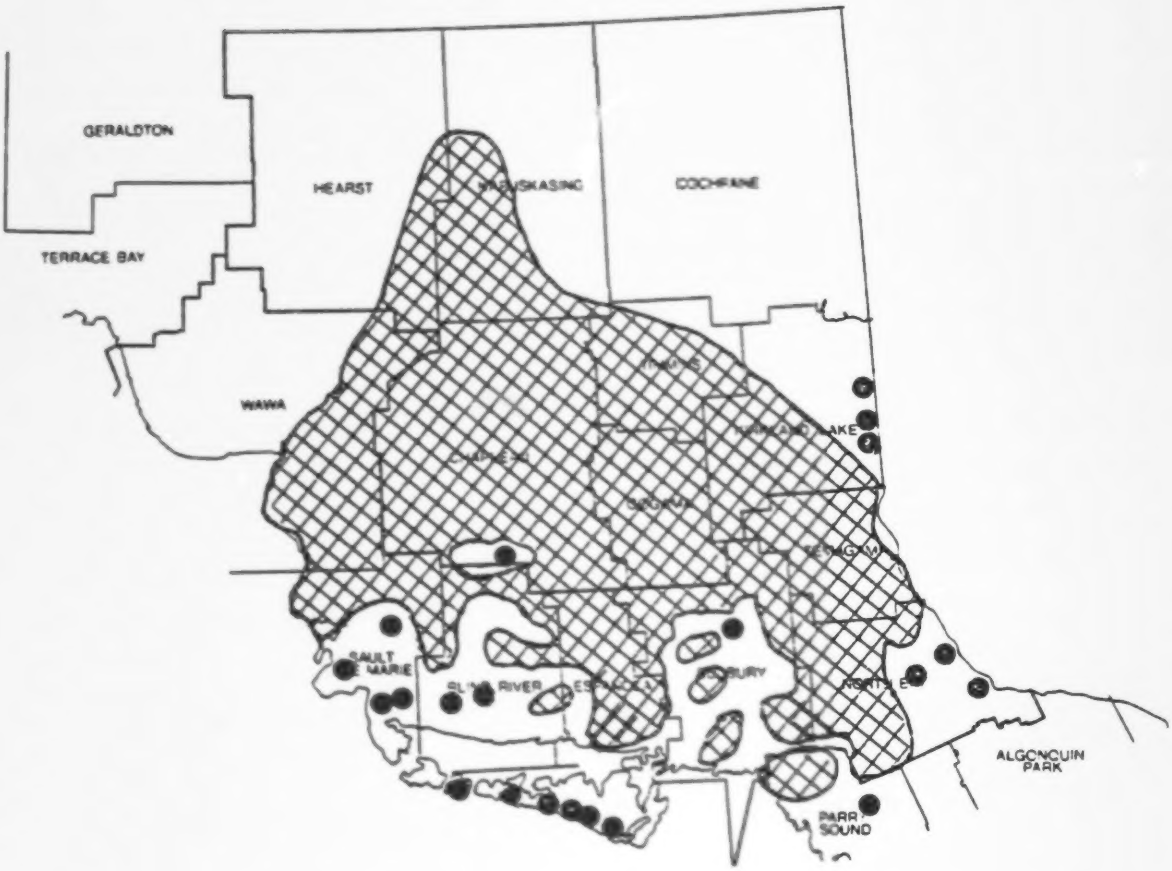
Spruce Budworm

Areas within which defoliation occurred in 1973

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

0 Miles 60

0 Kilometres 96

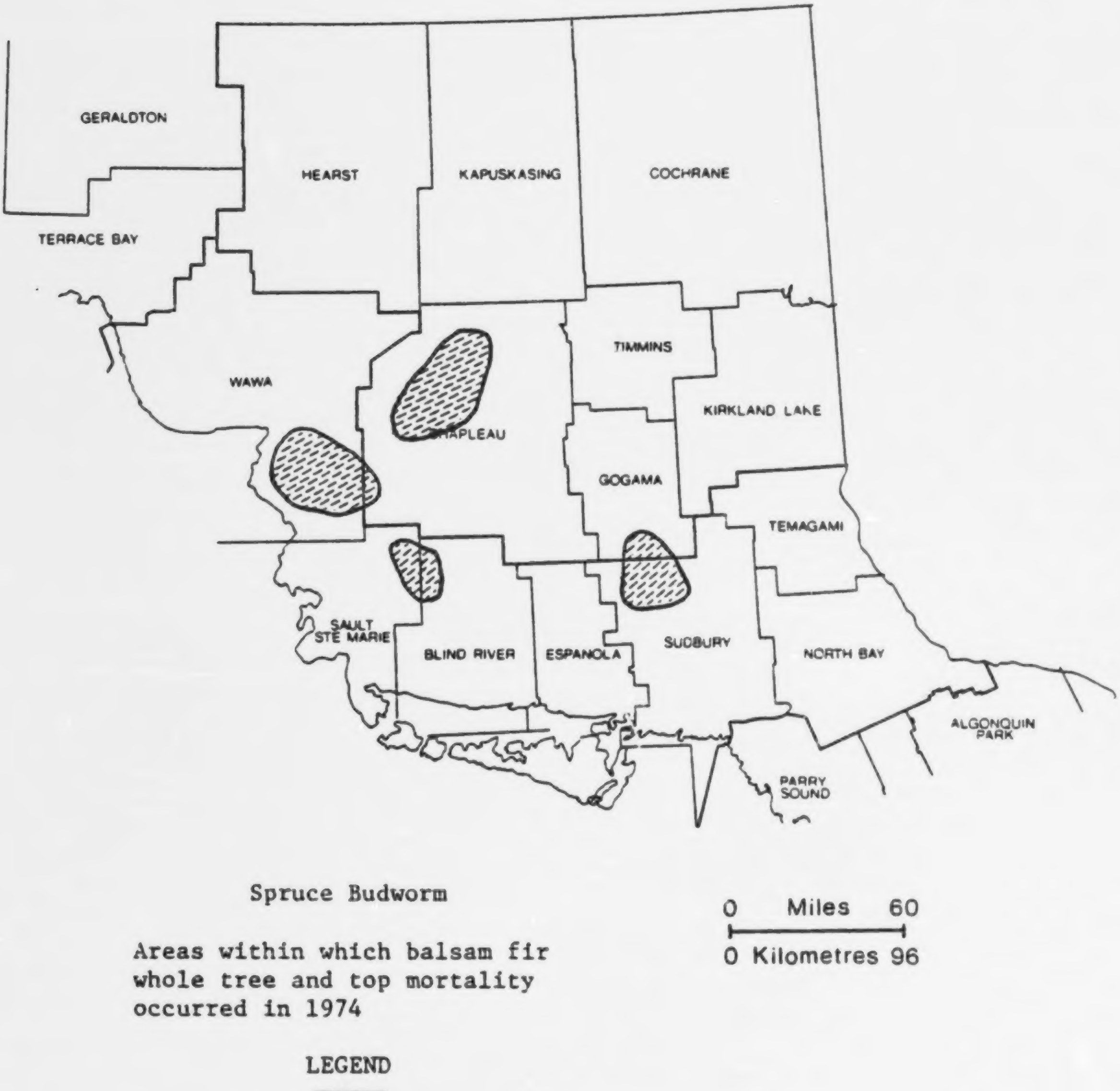
Spruce Budworm

Areas within which defoliation occurred in 1974

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Spruce Budworm

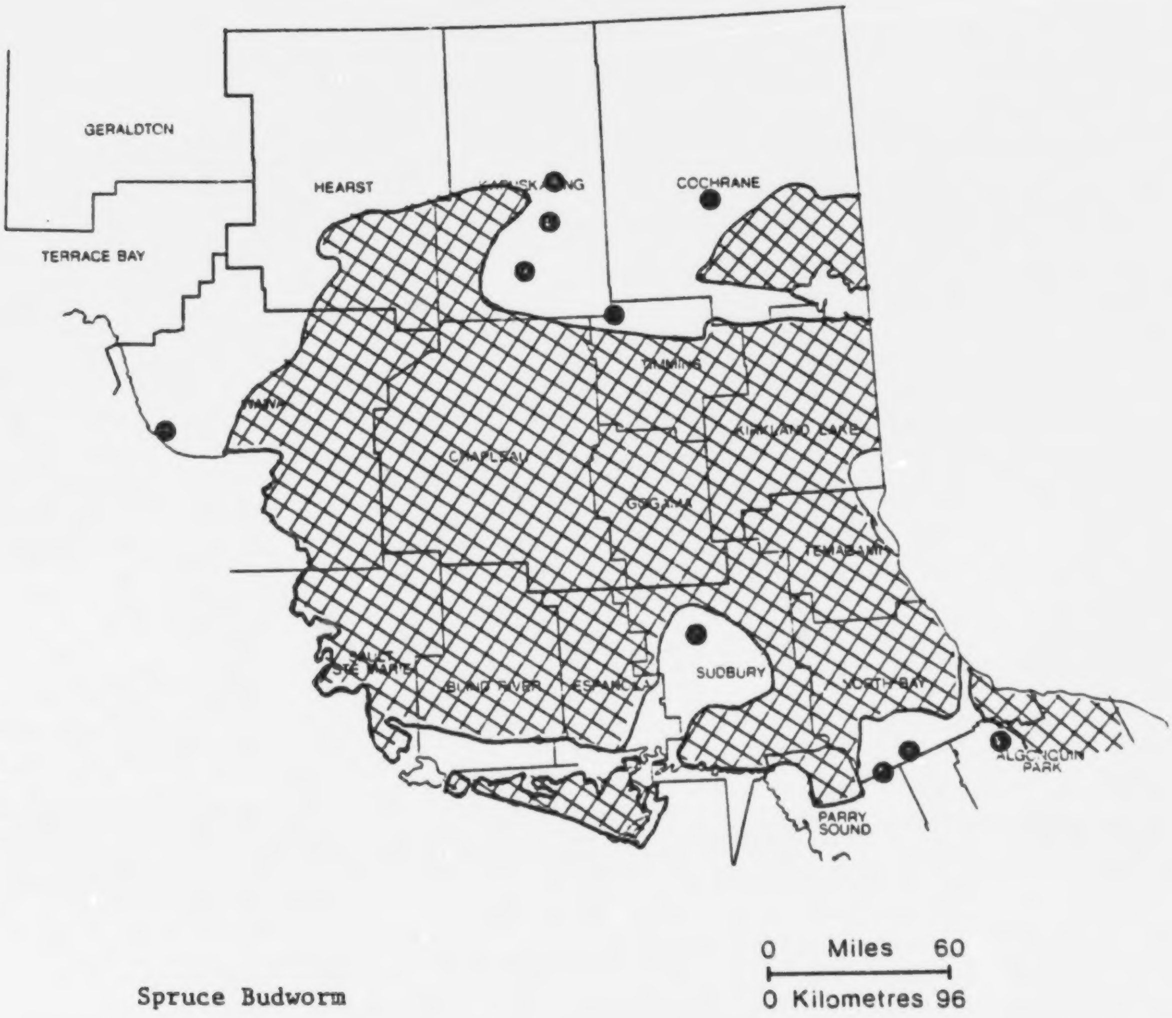
Areas within which balsam fir whole tree and top mortality occurred in 1974

0 Miles 60
0 Kilometres 96

LEGEND

Mortality ▨

NORTHEASTERN ONTARIO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NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

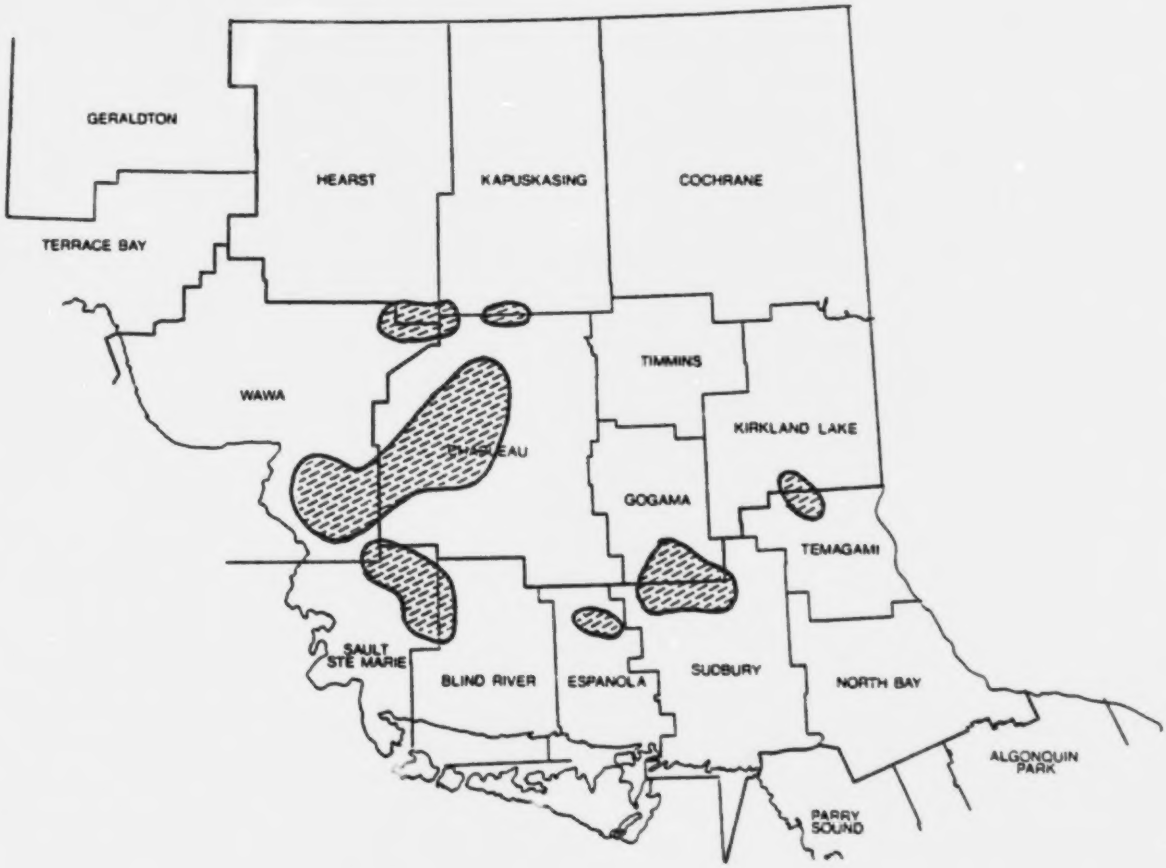
Spruce Budworm

Areas within which defoliation occurred in 1975

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1975

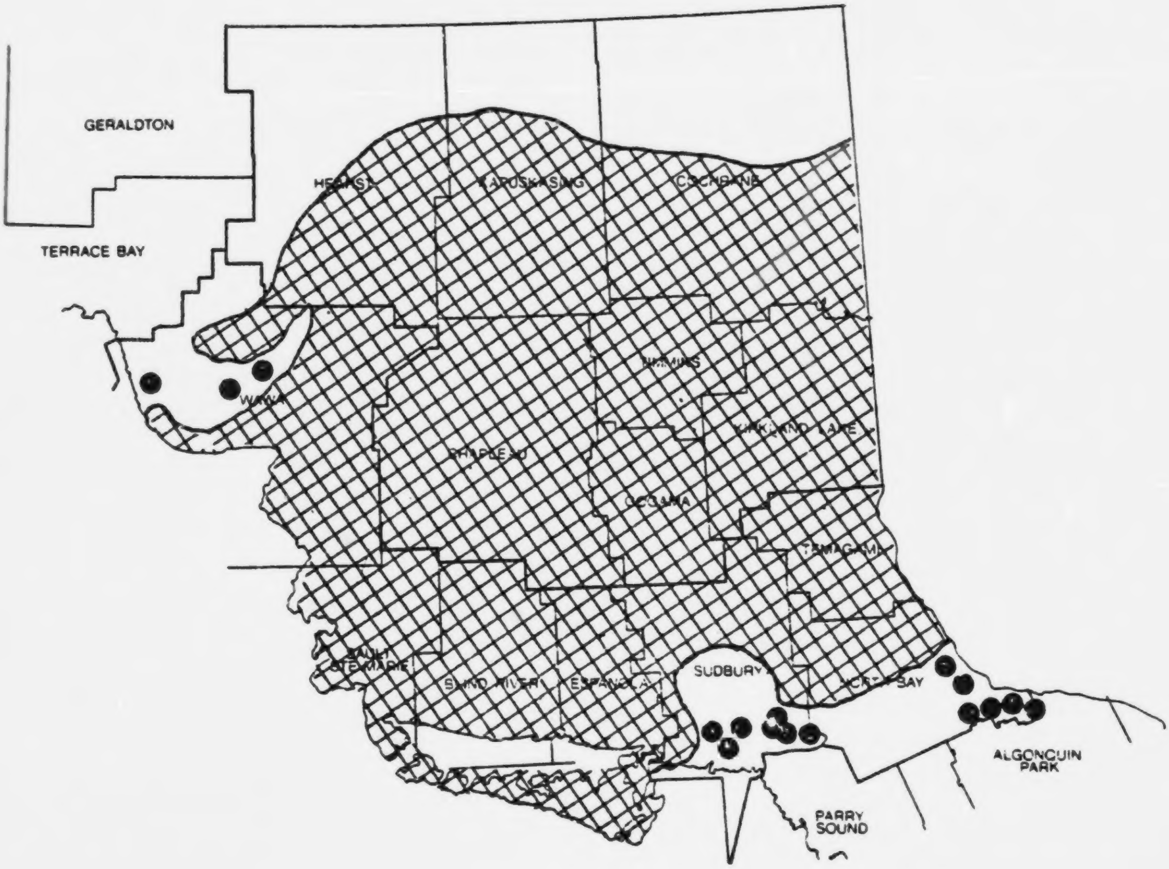
0 Miles 60

0 Kilometres 96

LEGEND

Mortality ▨

NORTHEASTERN ONTARIO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ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

0 Miles 60

0 Kilometres 96

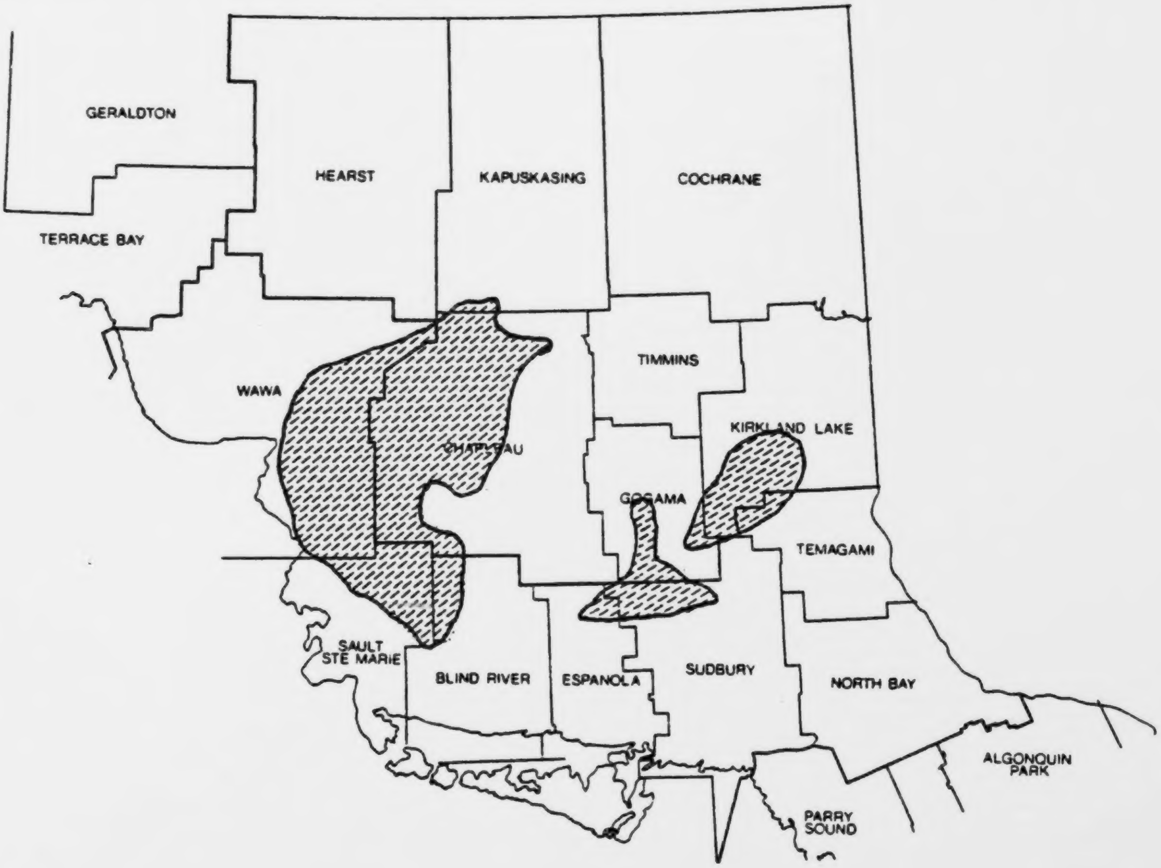
Spruce Budworm

Areas within which defoliation
occurred in 1976

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

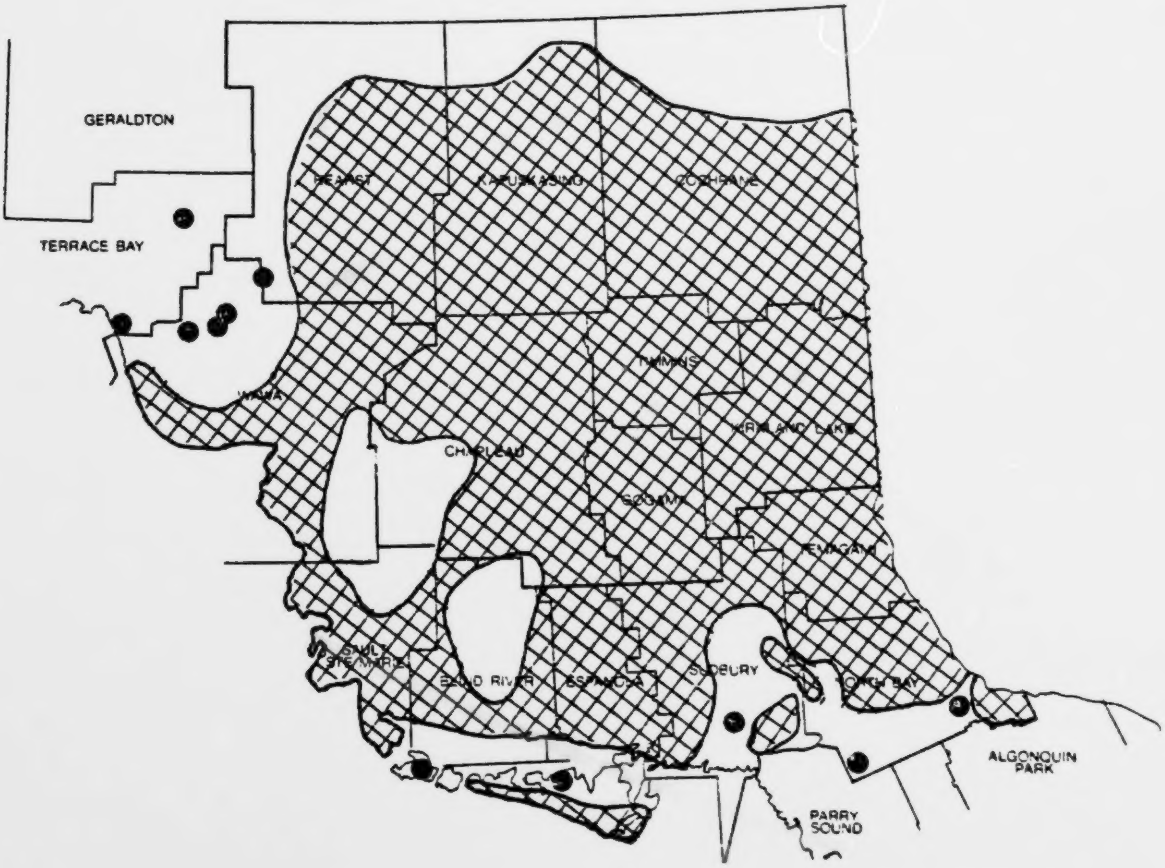
Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1976

LEGEND

Mortality ▨

NORTHEASTERN ONTARIO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BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

0 Miles 60
0 Kilometres 96

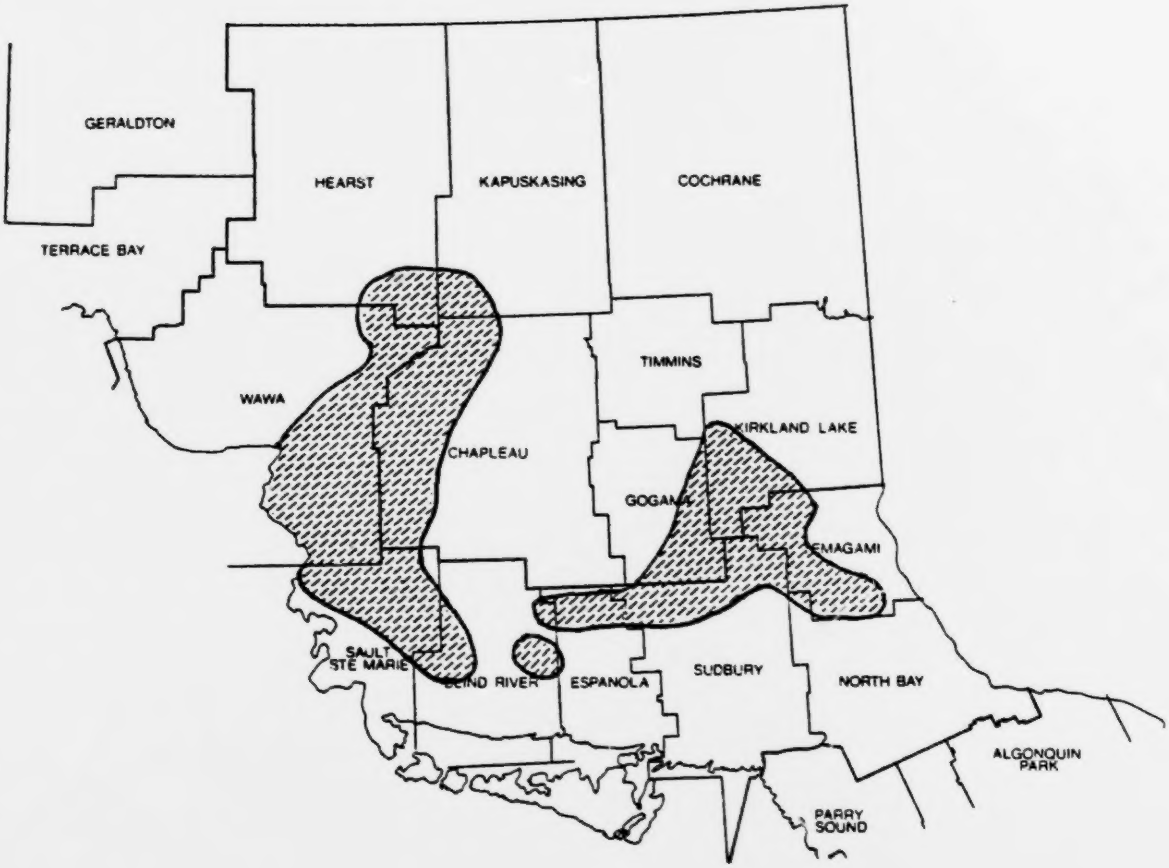
Spruce Budworm

Areas within which defoliation occurred in 1977

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Spruce Budworm

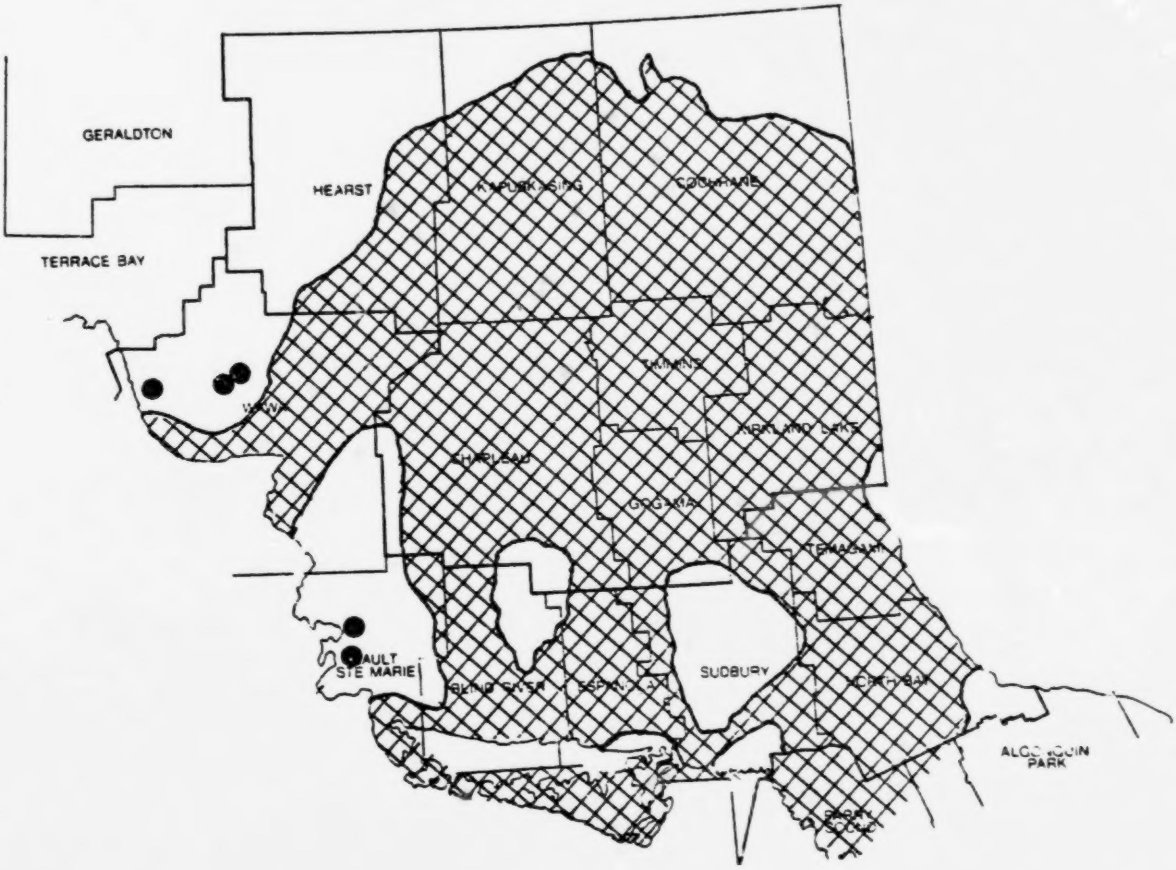
0 Miles 60
0 Kilometres 96

Areas within which balsam fir whole tree and top mortality occurred in 1977

LEGEND

Mortality ▨

NORTHEASTERN ONTARIO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ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

0 Miles 60
0 Kilometres 96

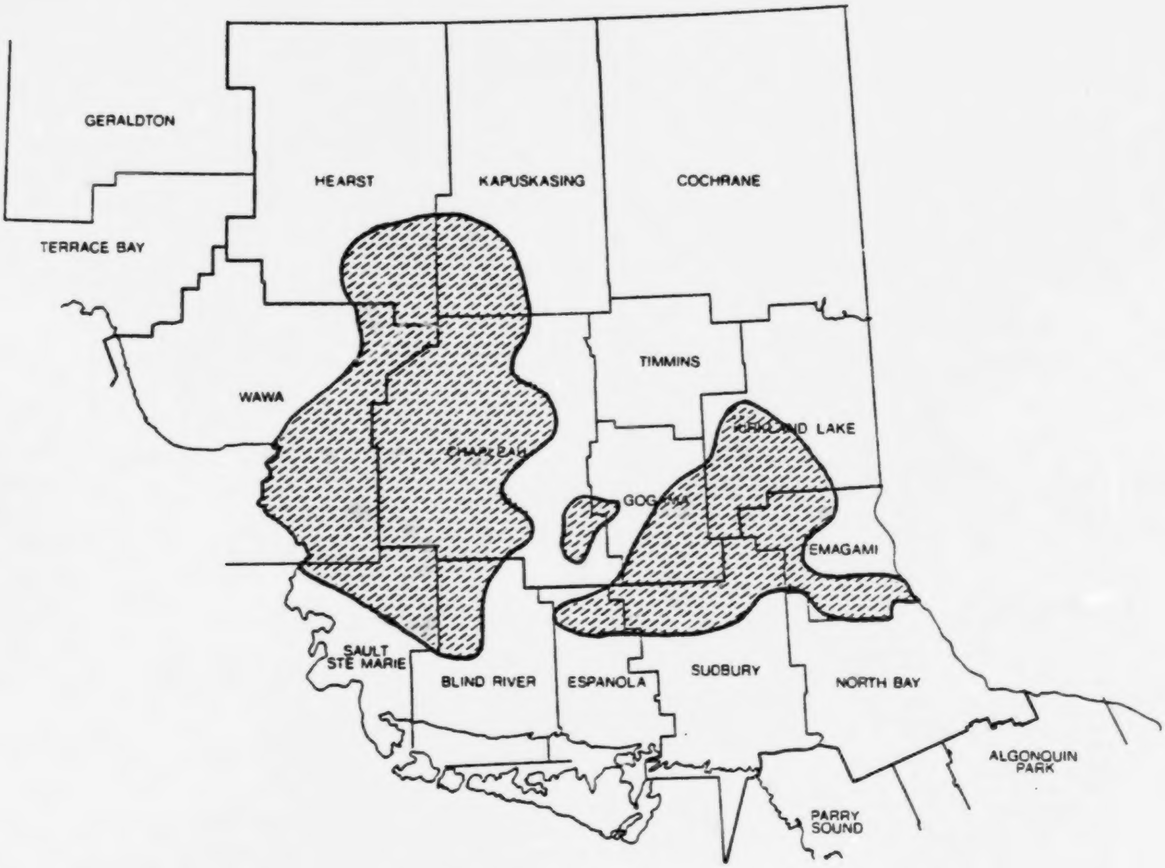
Spruce Budworm

Areas within which defoliation occurred in 1978

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Spruce Budworm

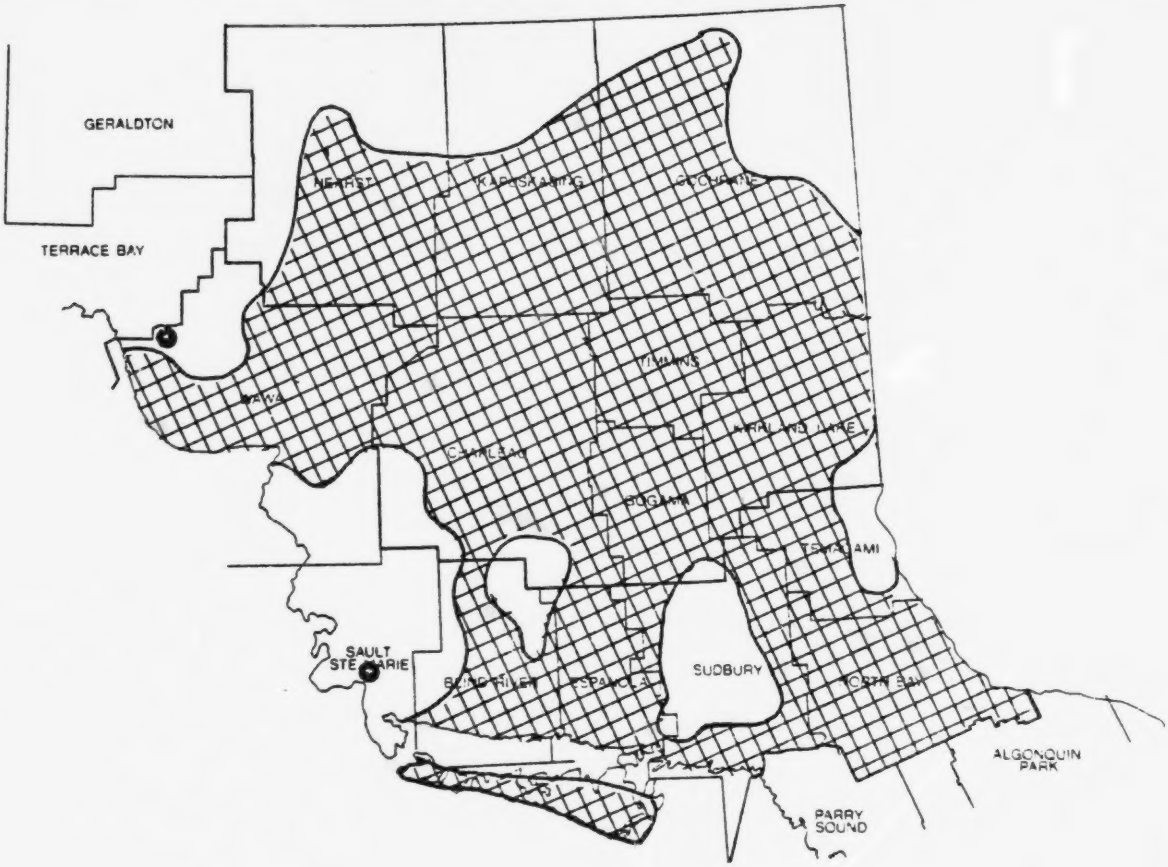
0 Miles 60
0 Kilometres 96

Areas within which balsam fir whole tree and top mortality occurred in 1978

LEGEND

Mortality ▨

NORTHEASTERN ONTARIO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ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

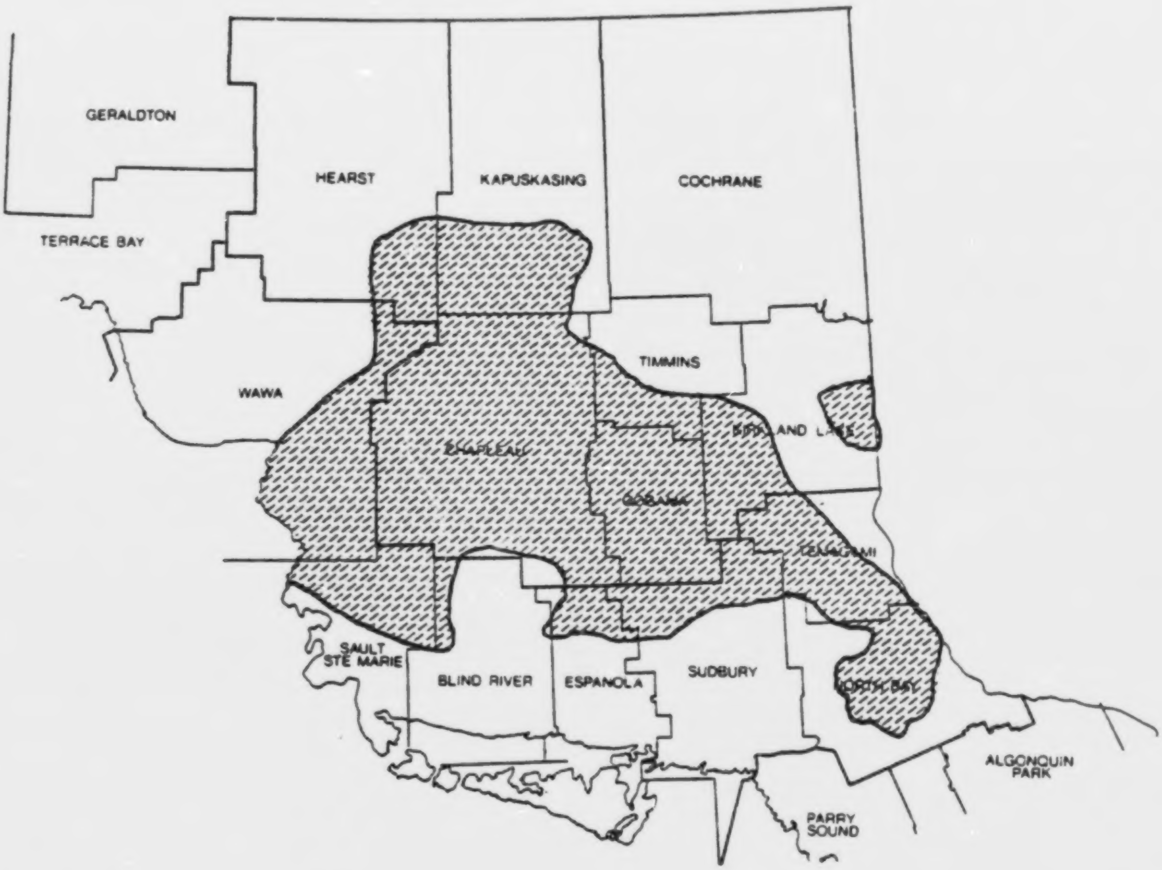
Spruce Budworm

Areas within which defoliation occurred in 1979

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Spruce Budworm

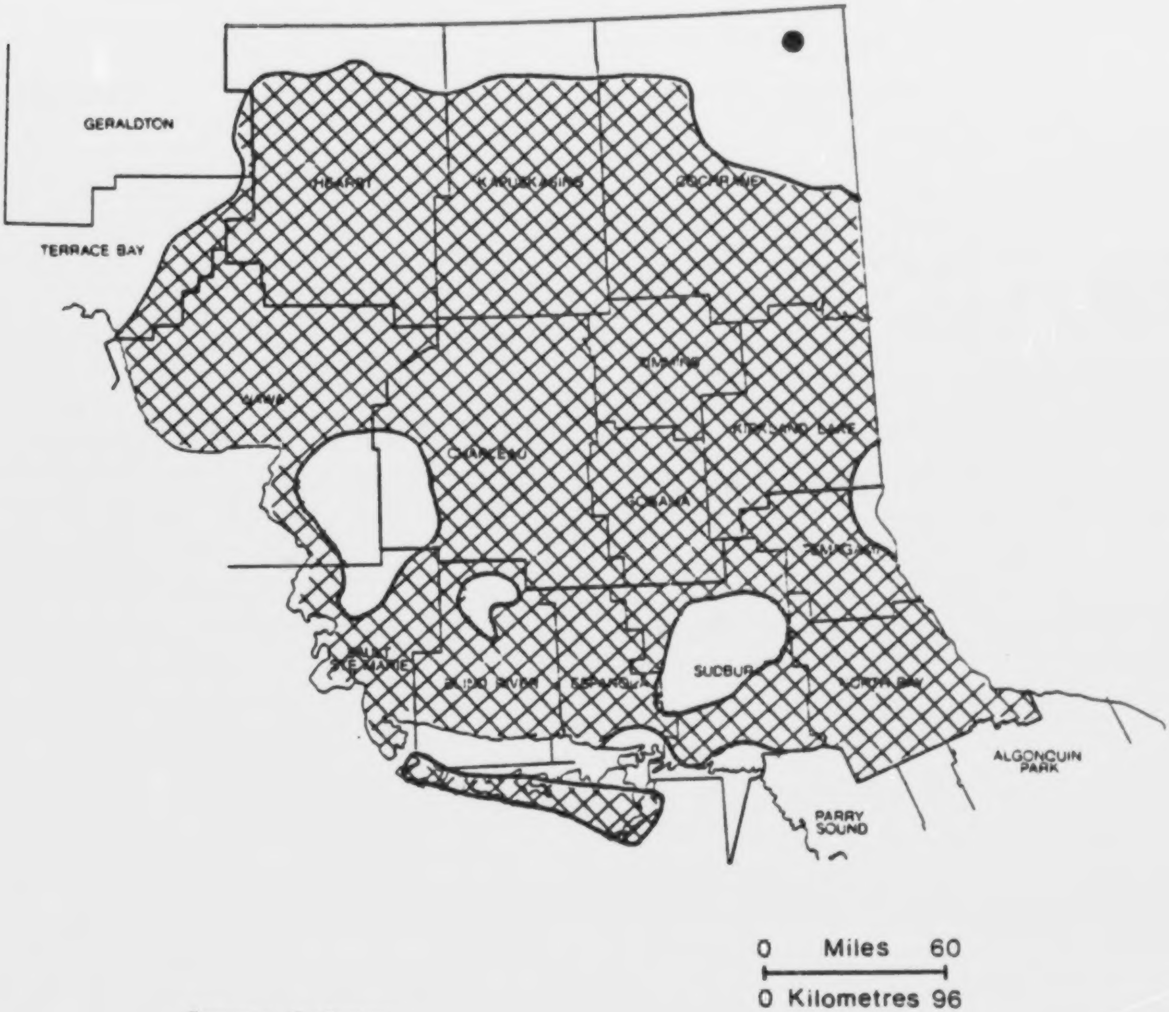
Areas within which balsam fir whole tree and top mortality occurred in 1979

0 Miles 60
0 Kilometres 96

LEGEND

Mortality ▨

NORTHEASTERN ONTARIO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BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

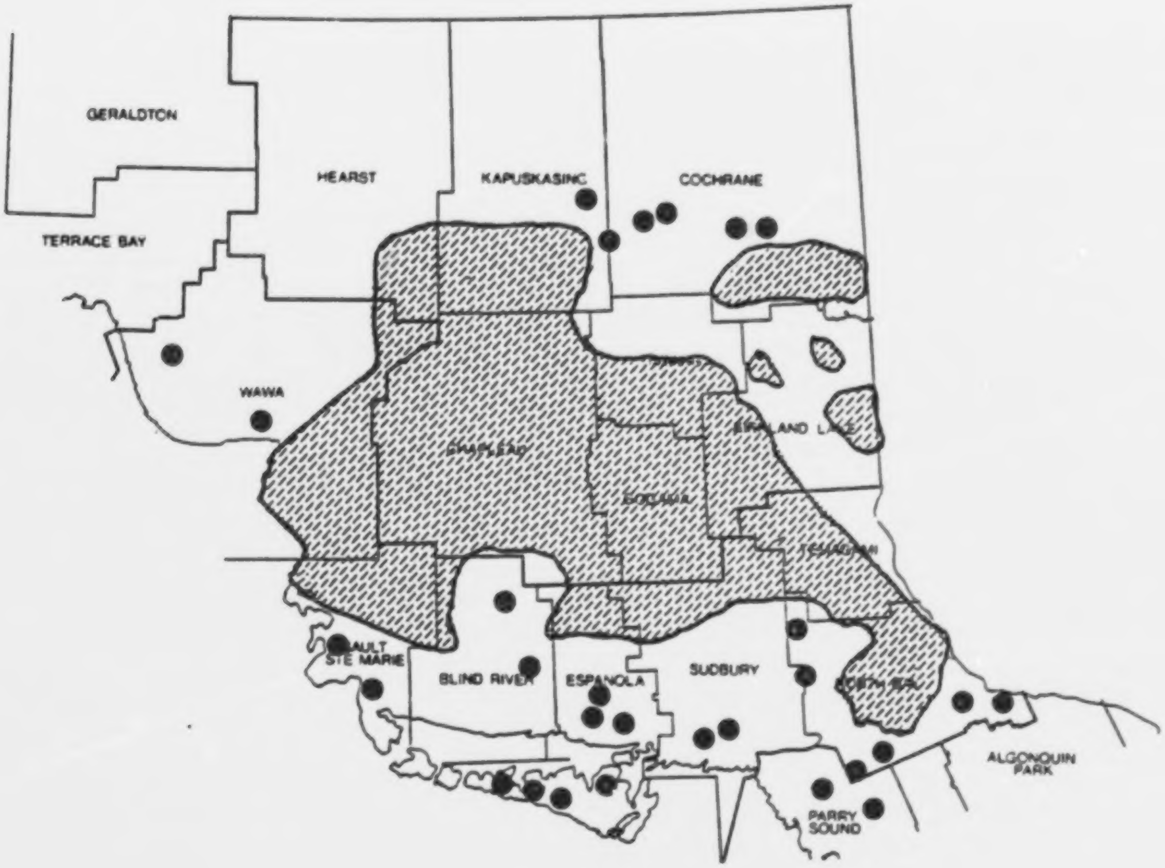
Spruce Budworm

Areas within which defoliation occurred in 1980

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Spruce Budworm

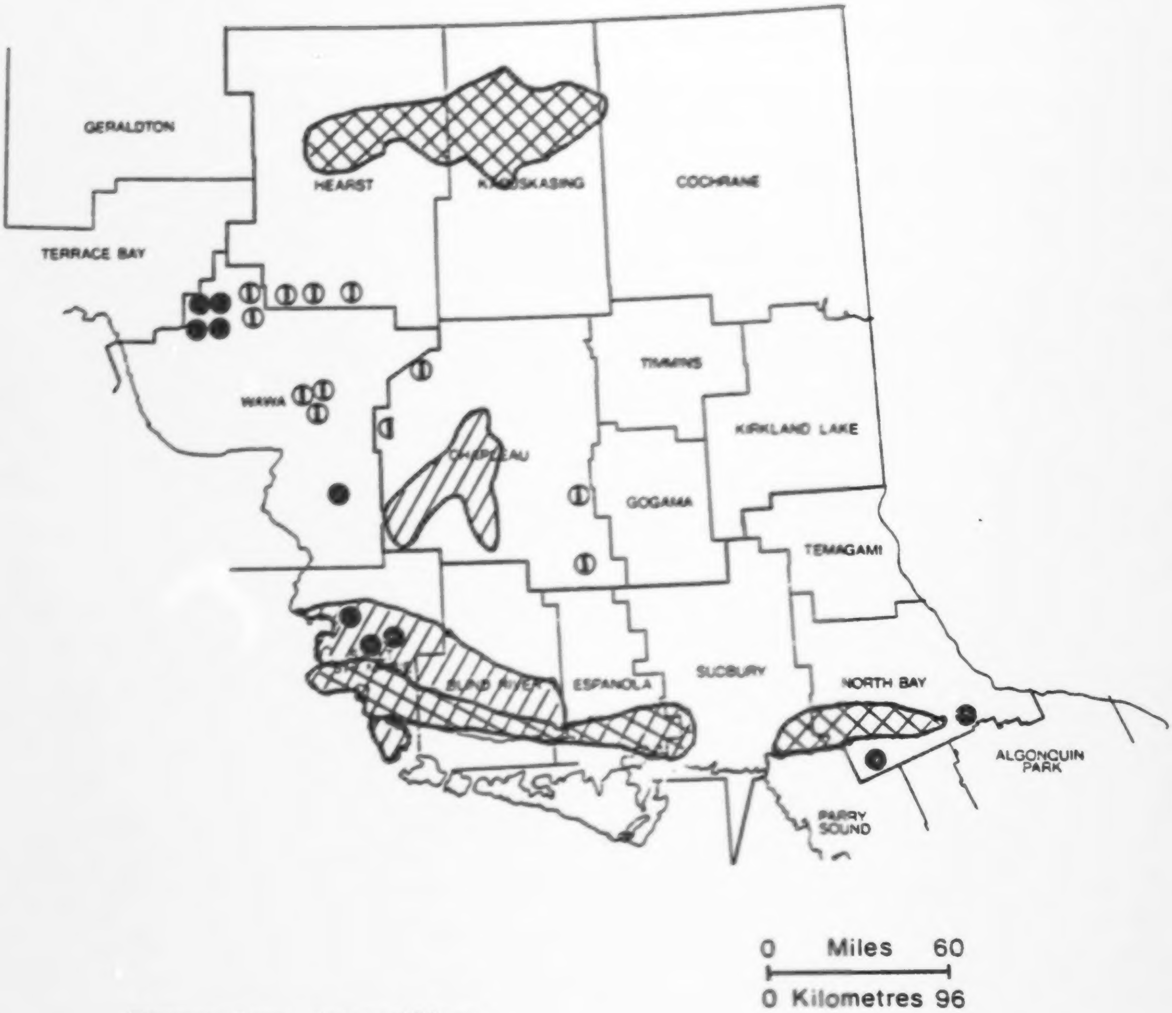
0 Miles 60
0 Kilometres 96

Areas within which balsam fir whole tree and top mortality occurred in 1980

LEGEND

Mortality ▨ or ●

NORTHEASTERN ONTARIO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BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

Forest Tent Caterpillar

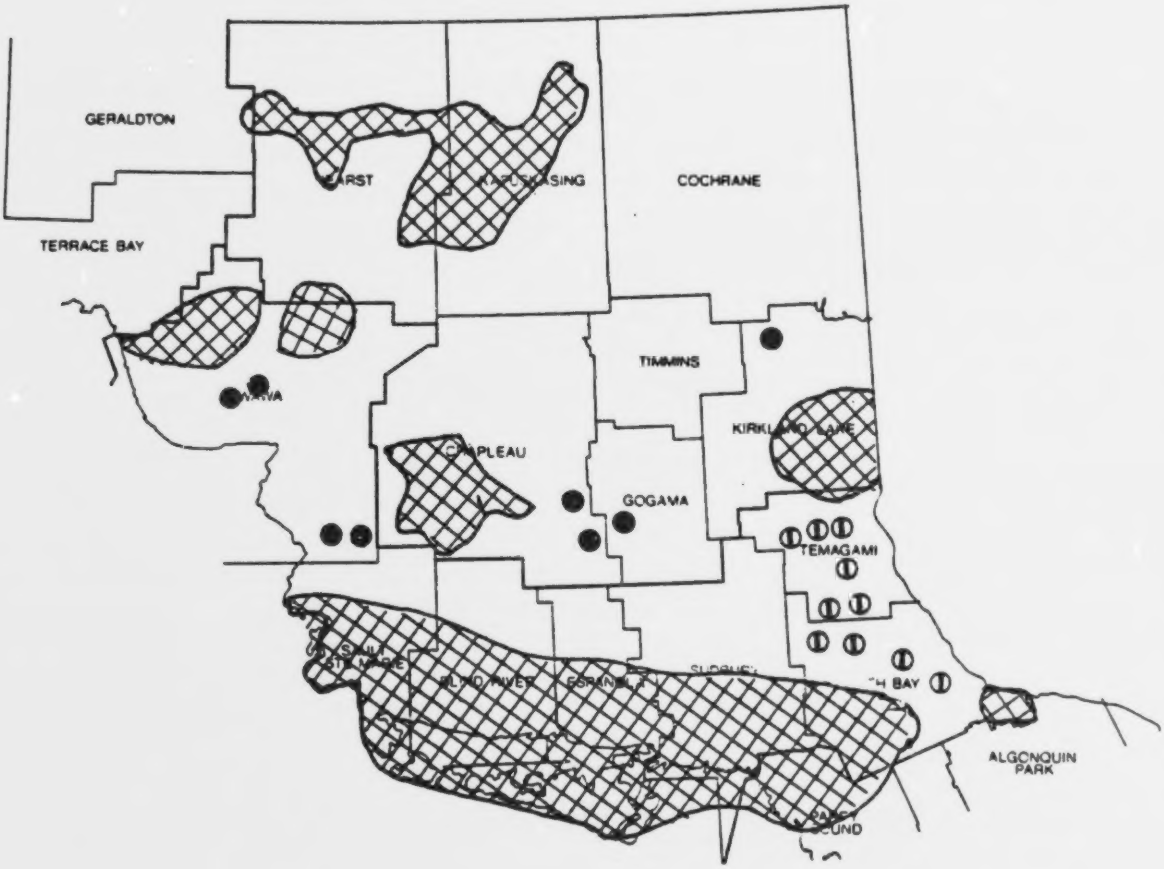
Areas within which defoliation occurred in 1950

LEGEND

Light defoliation ◑ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO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BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Forest Tent Caterpillar

0 Miles 60
0 Kilometres 96

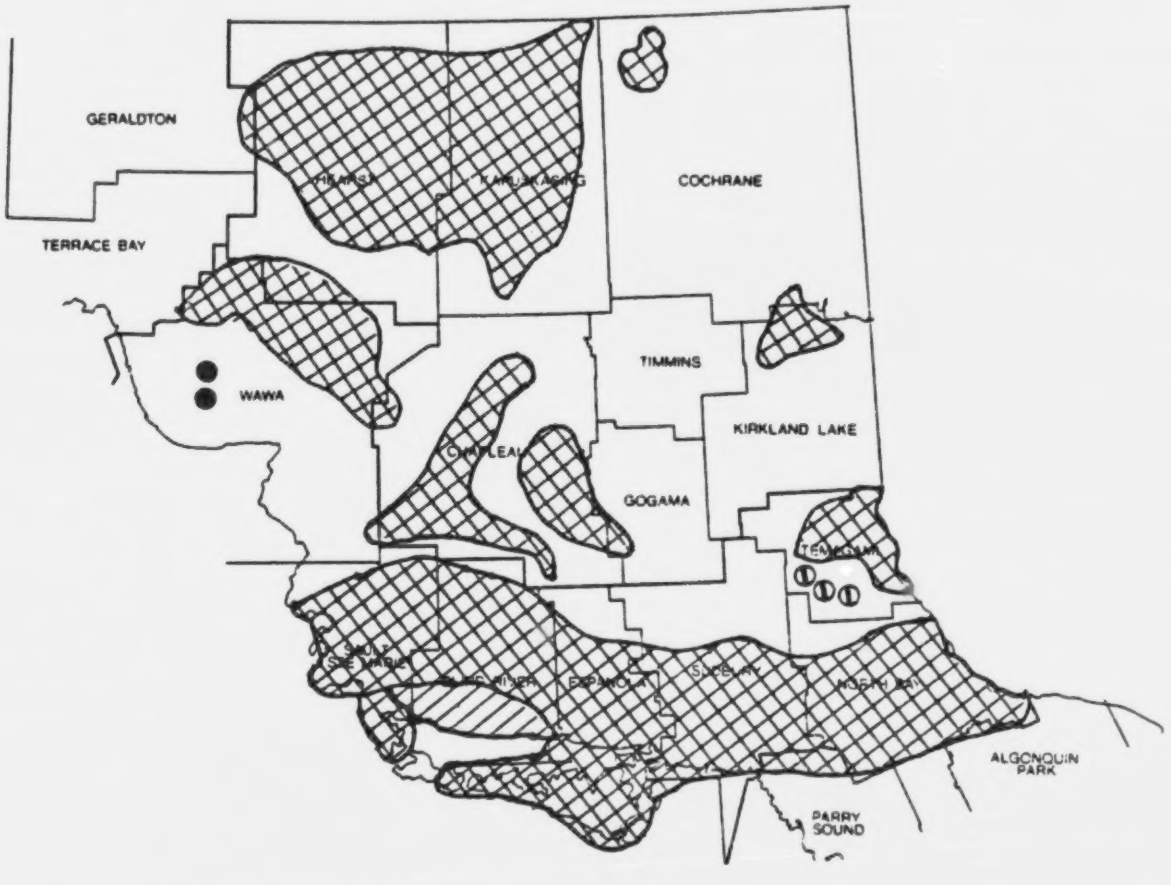
Areas within which defoliation
occurred in 1951

LEGEND

Light defoliation ⦶

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO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ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Forest Tent Caterpillar

Areas within which defoliation occurred in 1952

0 Miles 60

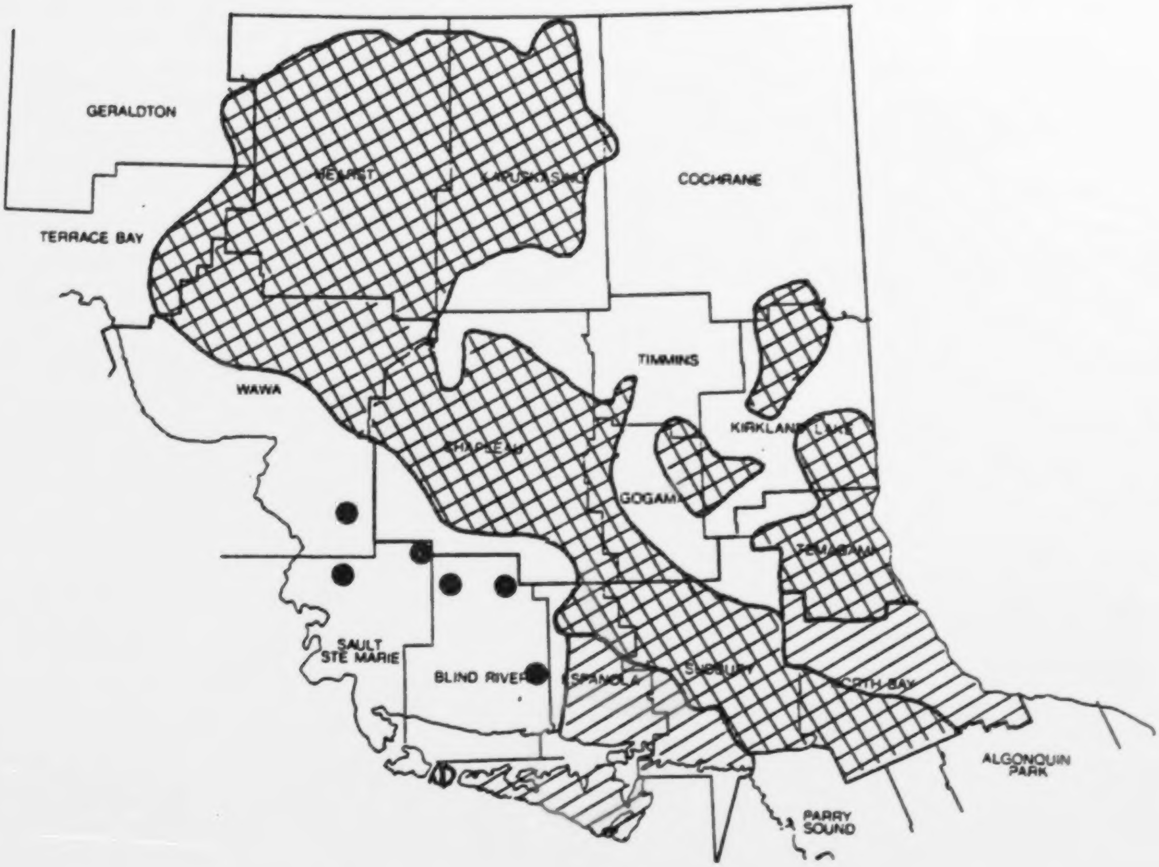
0 Kilometres 96

LEGEND

Light defoliation ⦶ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO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BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Forest Tent Caterpillar

Areas within which defoliation occurred in 1953

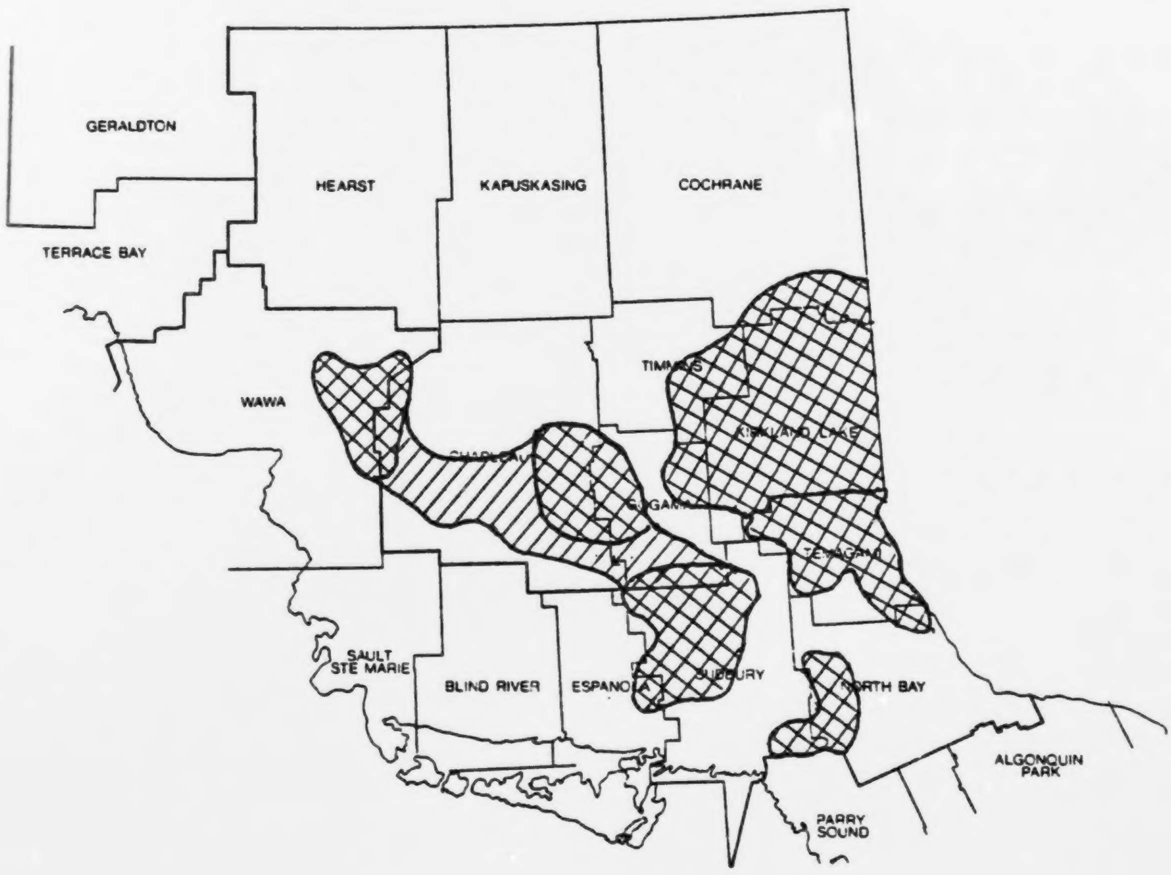
0 Miles 60
0 Kilometres 96

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO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ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Forest Tent Caterpillar

Areas within which defoliation occurred in 1954

LEGEND

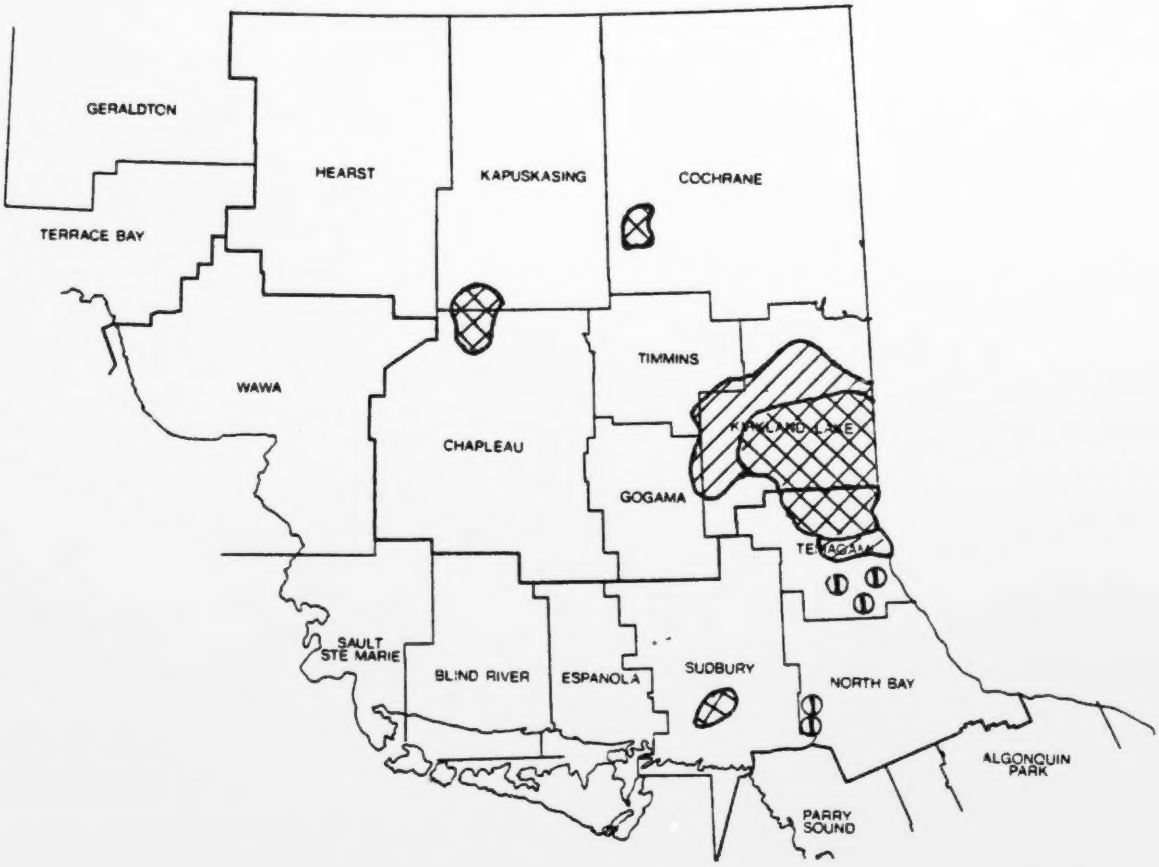
Light defoliation ▨

Moderate-to-severe defoliation ▩

0 Miles 60

0 Kilometres 96

NORTHEASTERN ONTARIO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BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Forest Tent Caterpillar

Areas within which defoliation occurred in 1955

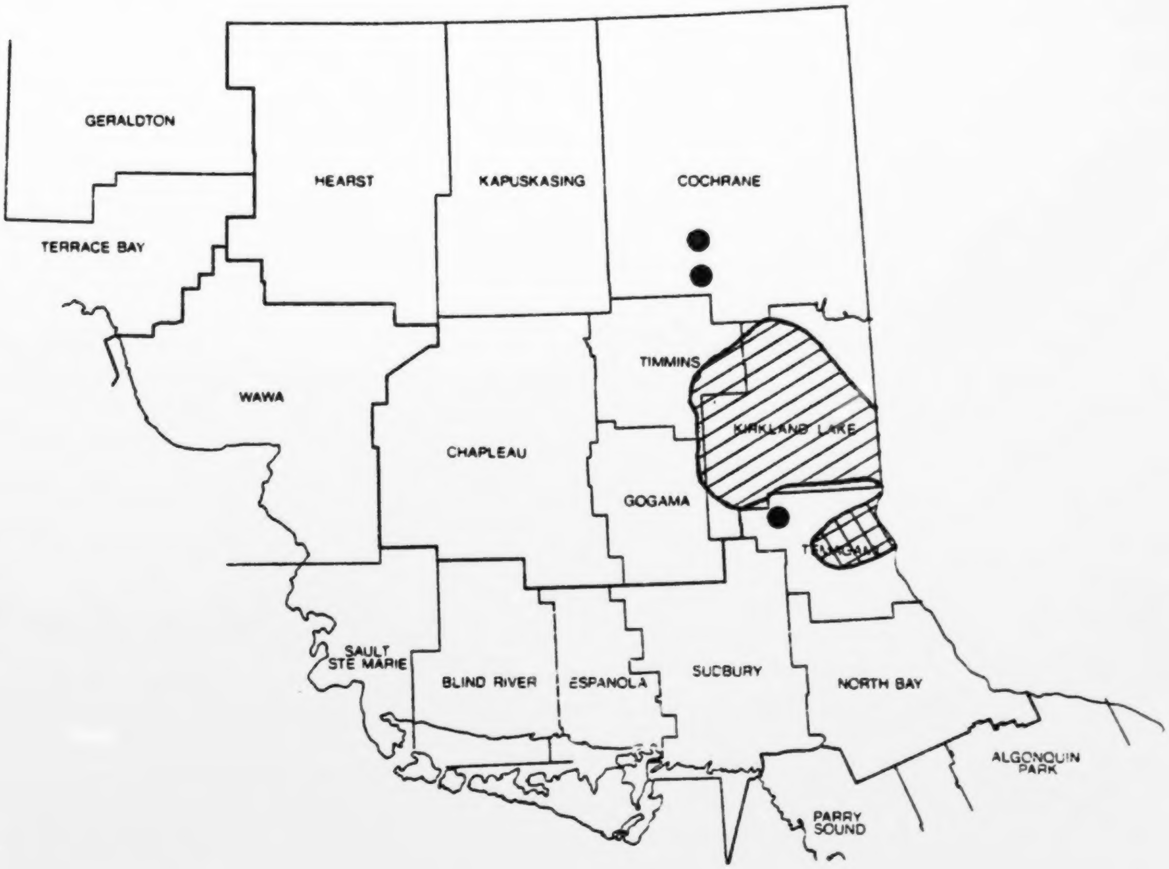
0 Miles 60
0 Kilometres 96

LEGEND

Light defoliation ⦶ or ▨

Moderate-to-severe defoliation ▦

NORTHEASTERN ONTARIO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SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

0 Miles 60
0 Kilometres 96

Forest Tent Caterpillar

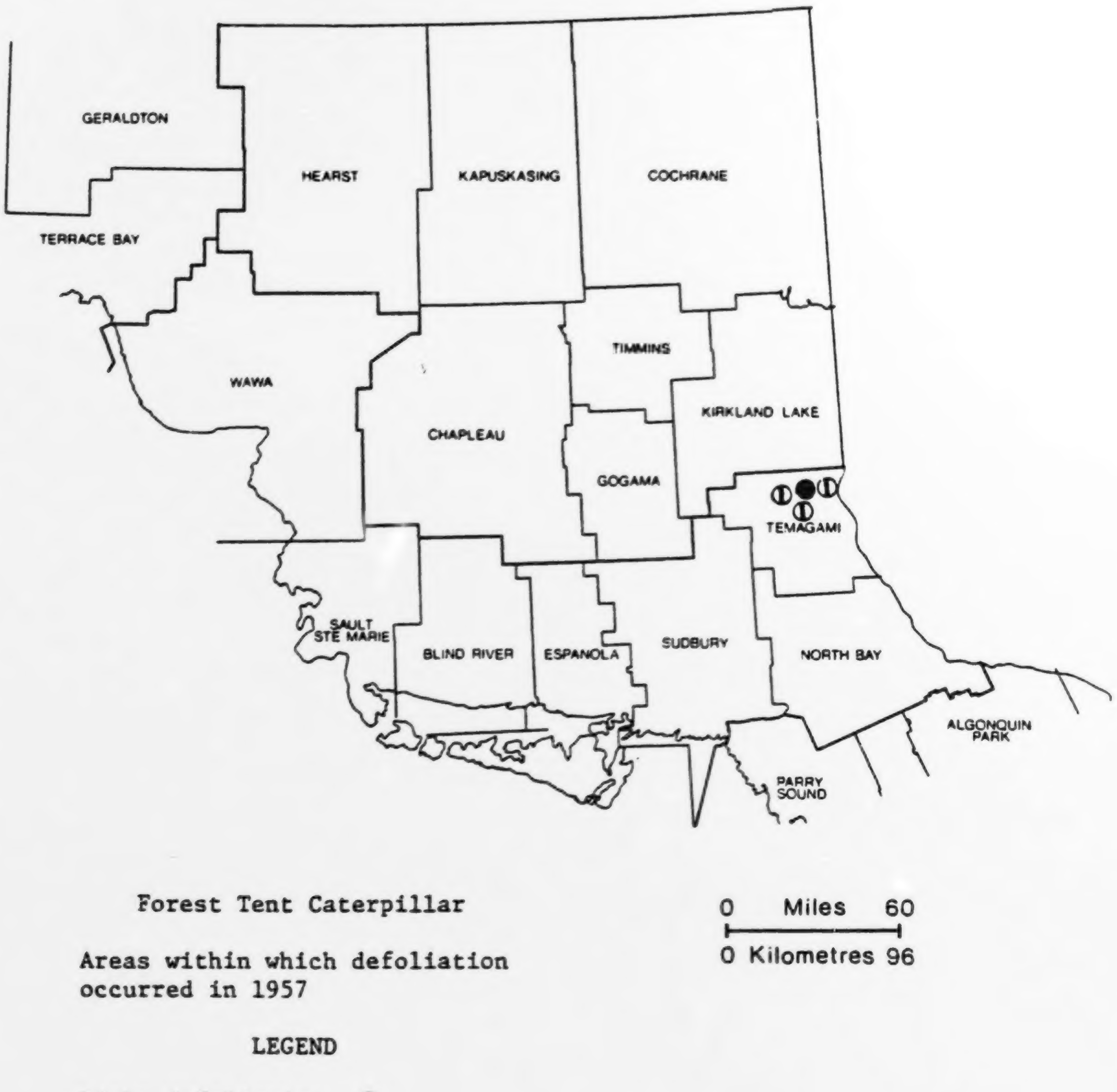
Areas within which defoliation occurred in 1956

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO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ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Forest Tent Caterpillar

Areas within which defoliation occurred in 1957

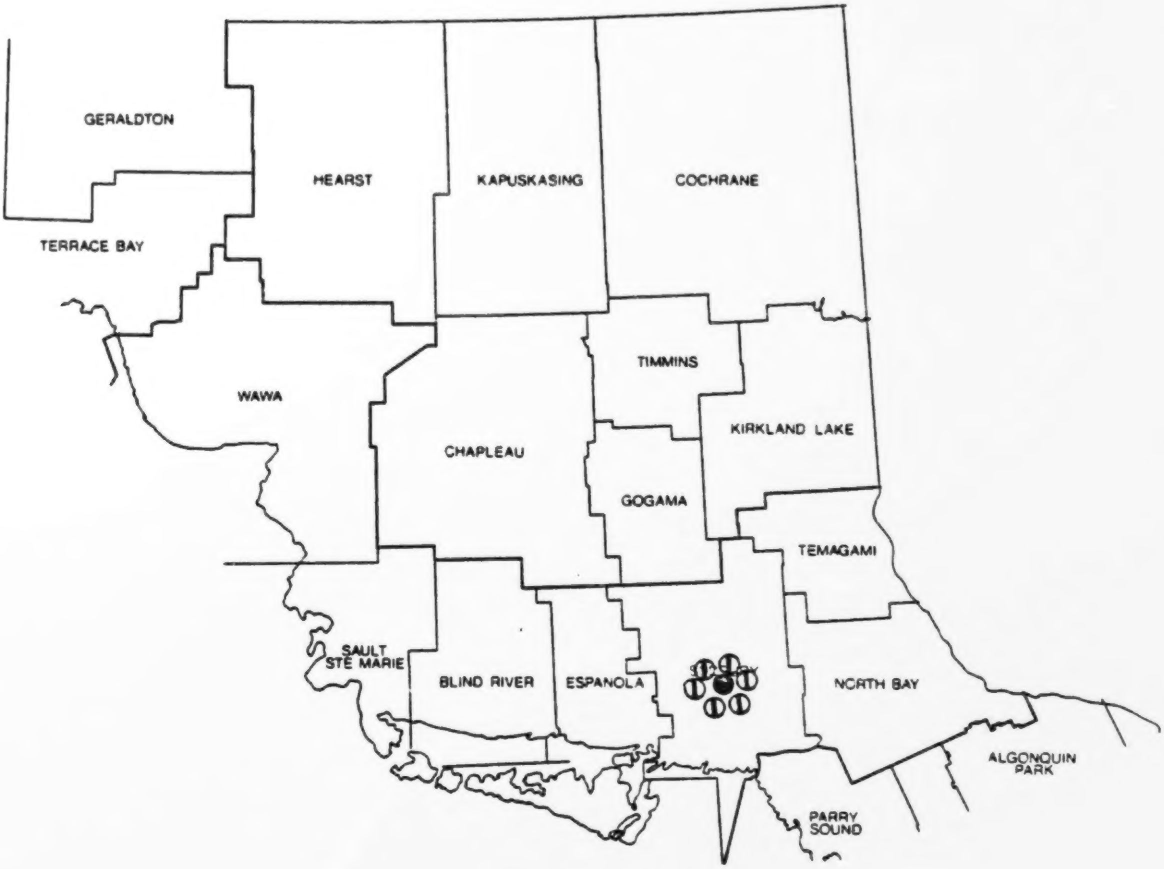
0 Miles 60
0 Kilometres 96

LEGEND

Light defoliation ◑

Moderate-to-severe defoliation ●

NORTHEASTERN ONTARIO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BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

Forest Tent Caterpillar

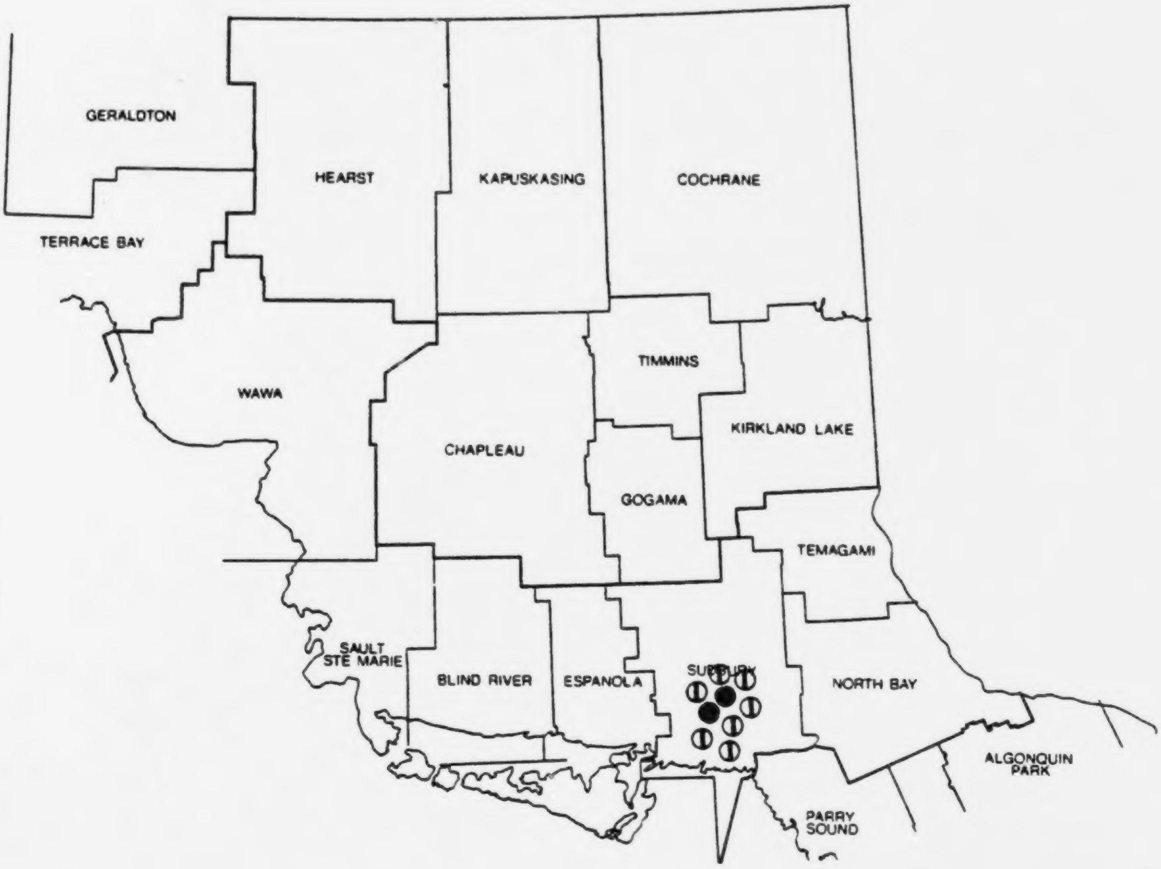
Areas within which defoliation occurred in 1960

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ●

NORTHEASTERN ONTARIO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SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Forest Tent Caterpillar

Areas within which defoliation occurred in 1961

0 Miles 60

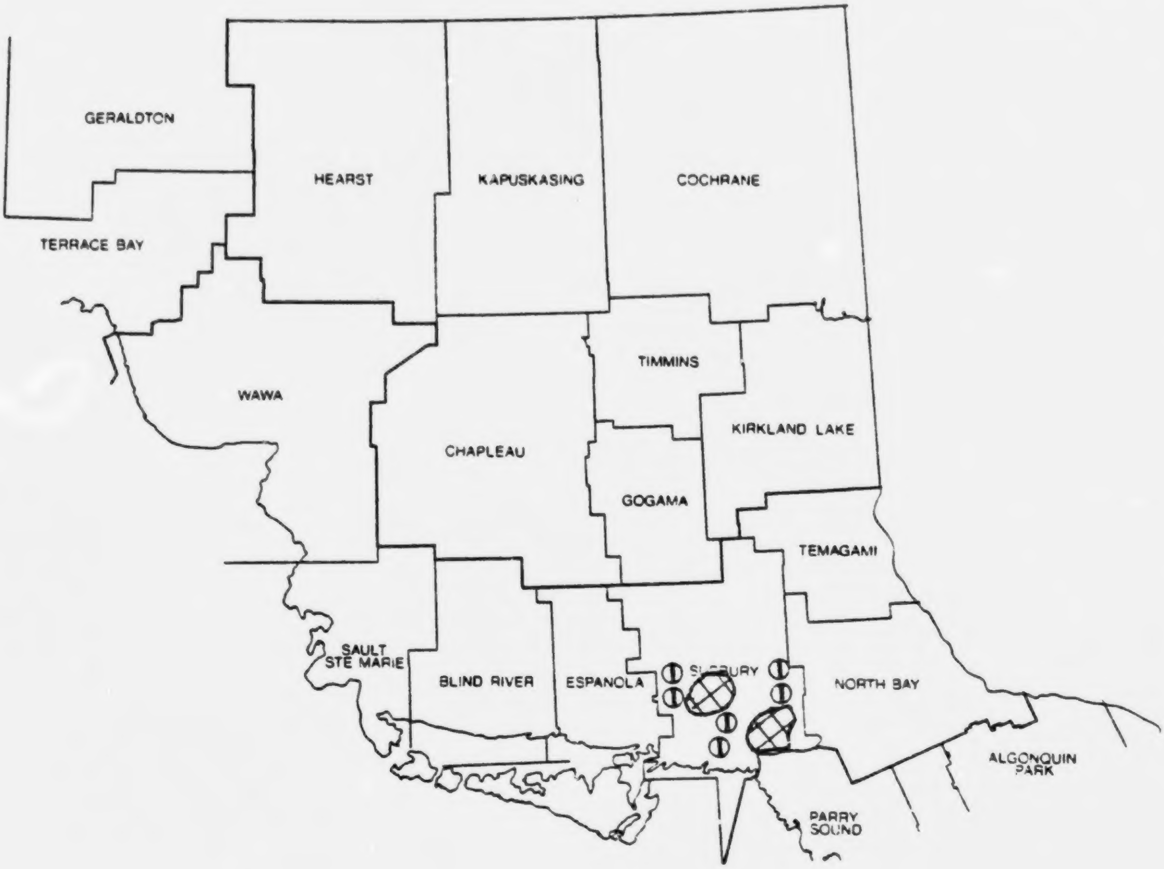
0 Kilometres 96

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ●

NORTHEASTERN ONTARIO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SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

Forest Tent Caterpillar

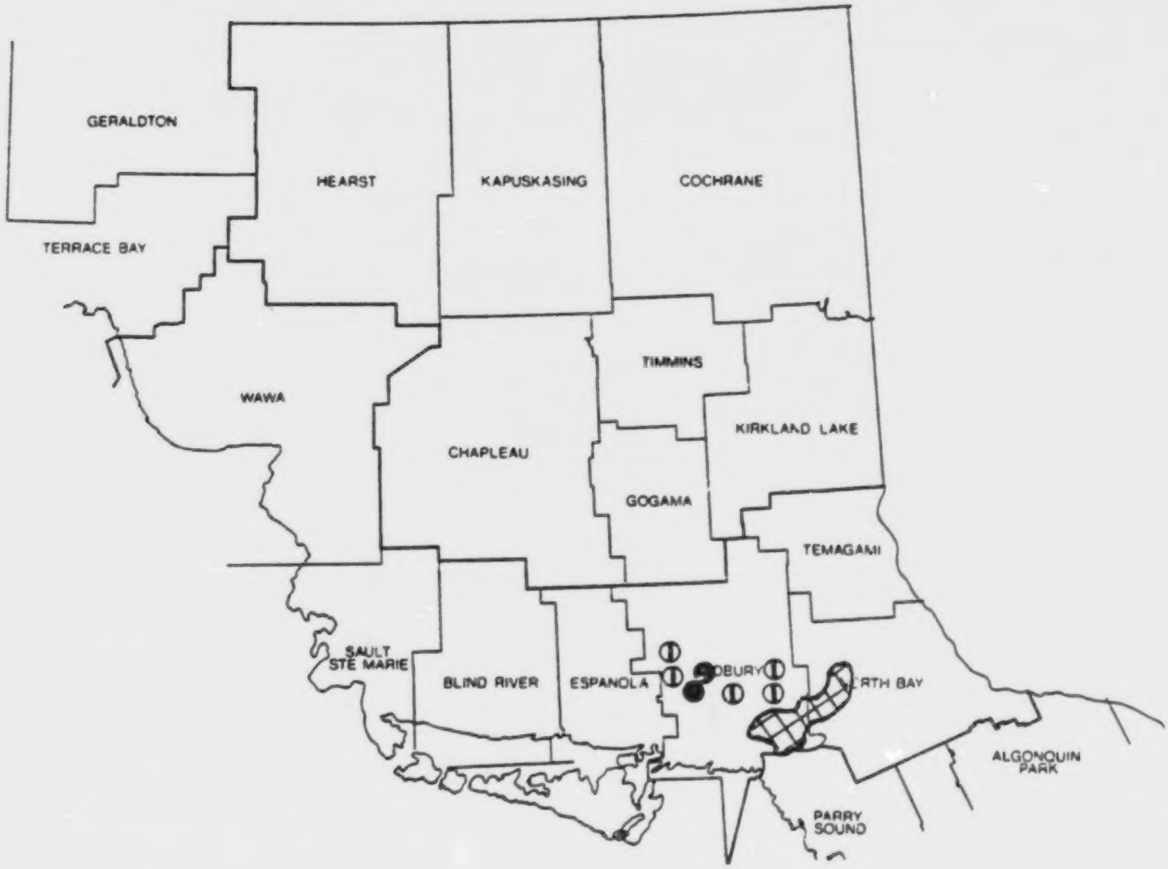
Areas within which defoliation occurred in 1962

LEGEND

Light defoliation ◑

Moderate-to-severe defoliation ▩

NORTHEASTERN ONTARIO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BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

0 Miles 60
0 Kilometres 96

Forest Tent Caterpillar

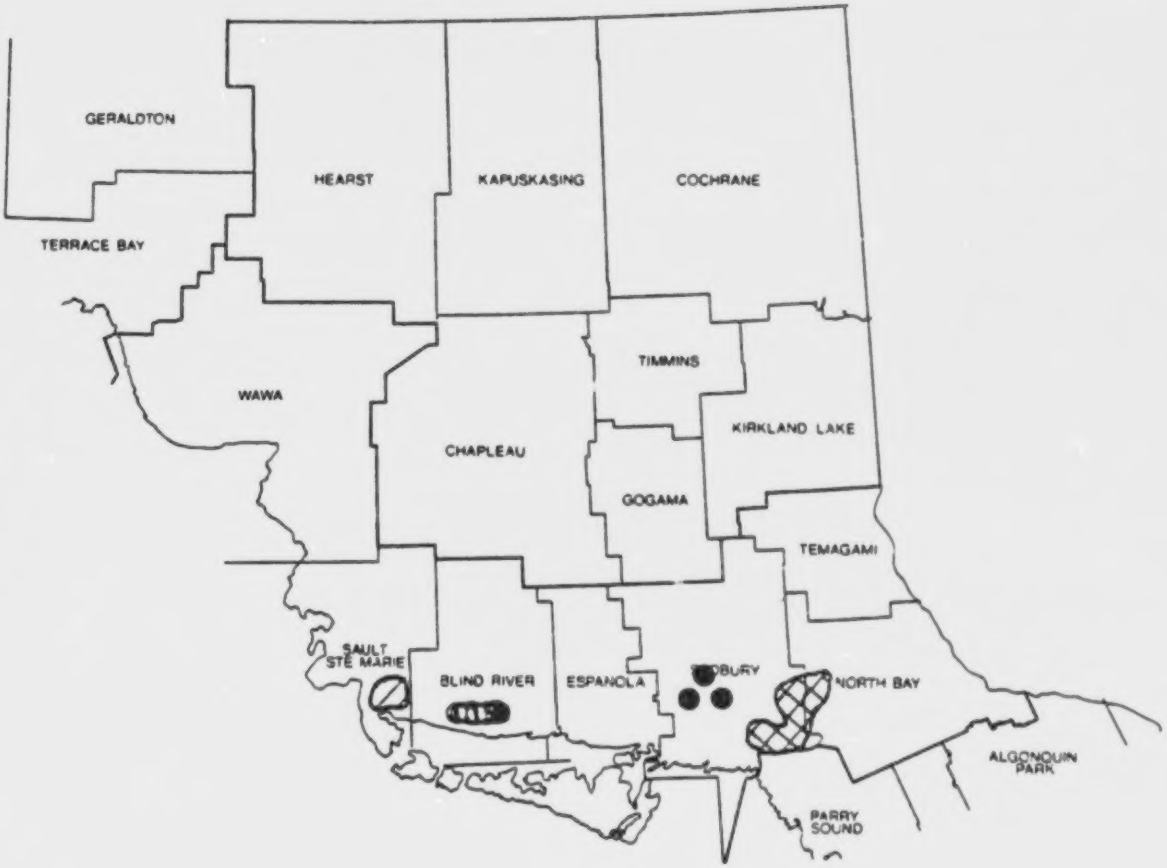
Areas within which defoliation occurred in 1963

LEGEND

Light defoliation ⦶

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Forest Tent Caterpillar

0 Miles 60
0 Kilometres 96

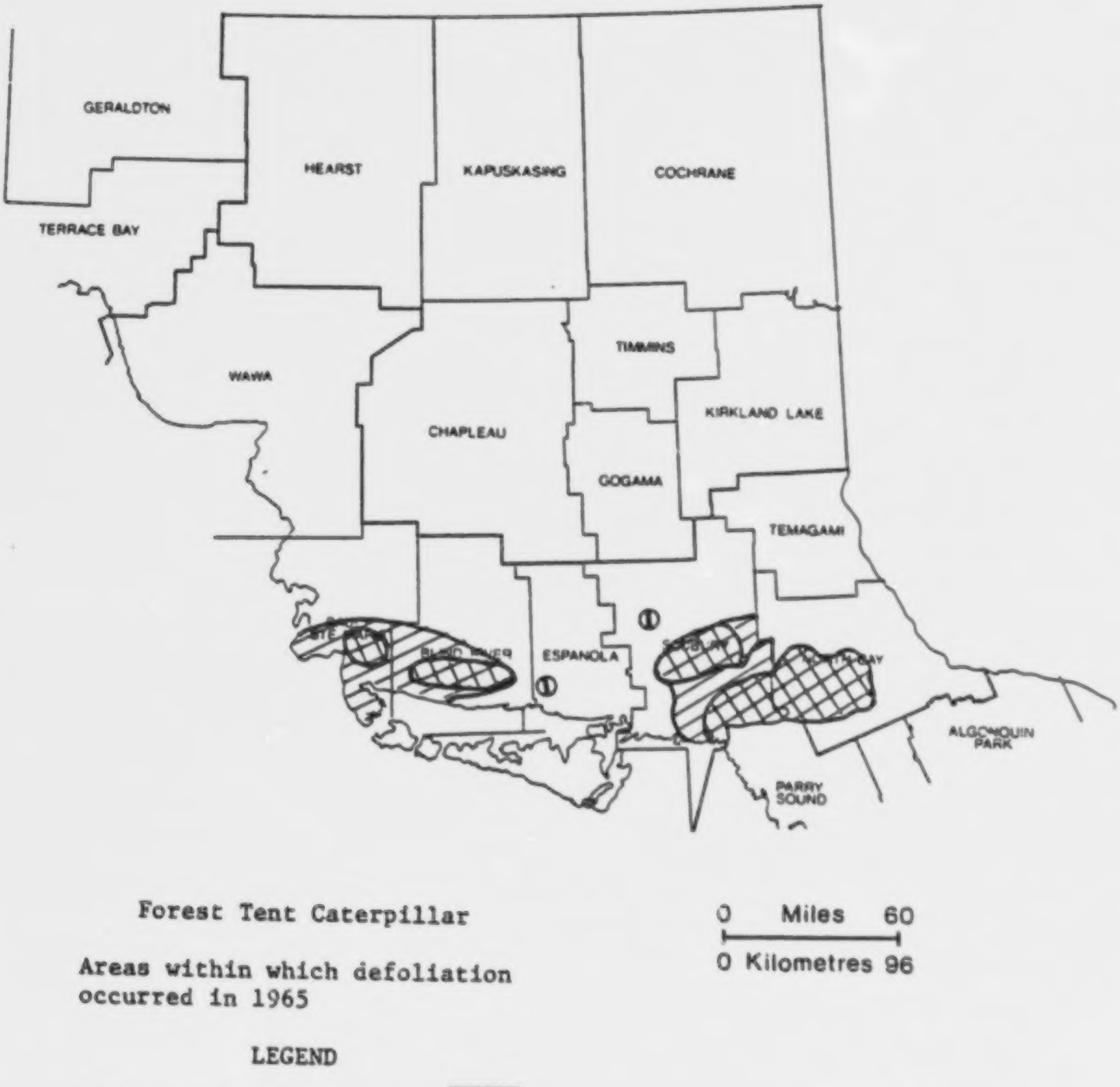
Areas within which defoliation occurred in 1964

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO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BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Forest Tent Caterpillar

Areas within which defoliation occurred in 1965

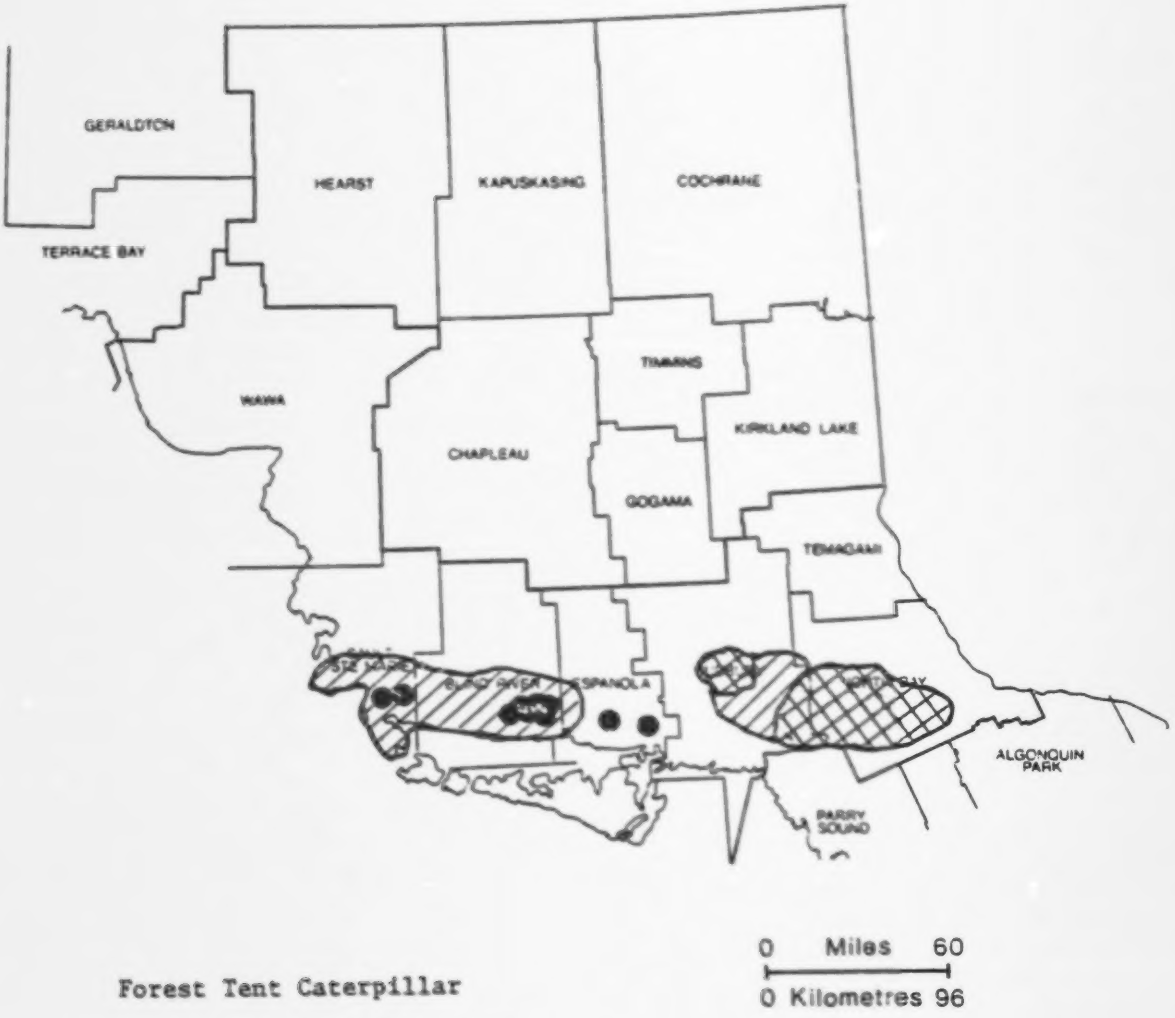
0 Miles 60
0 Kilometres 96

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ▦

NORTHEASTERN ONTARIO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STE MARIE
BLIND RIVER
ESPANOLA
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

Forest Tent Caterpillar

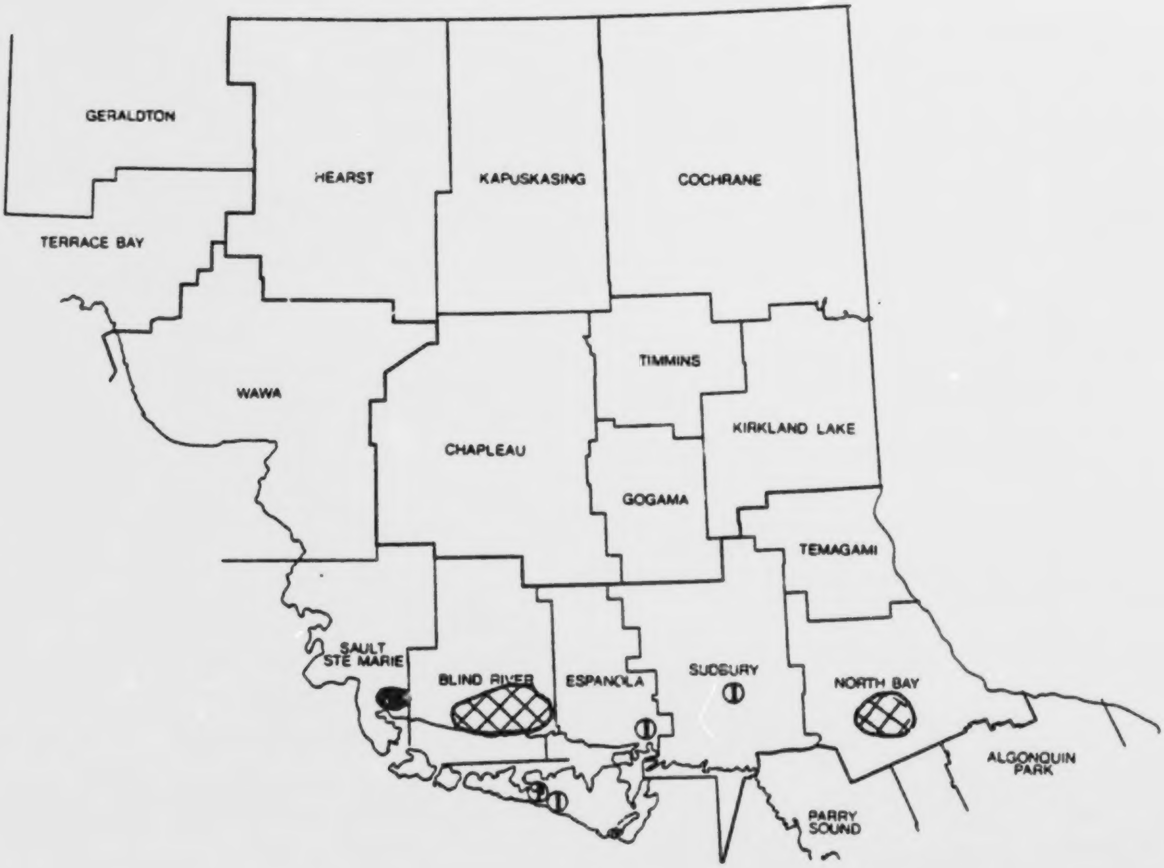
Areas within which defoliation occurred in 1966

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO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SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

Forest Tent Caterpillar

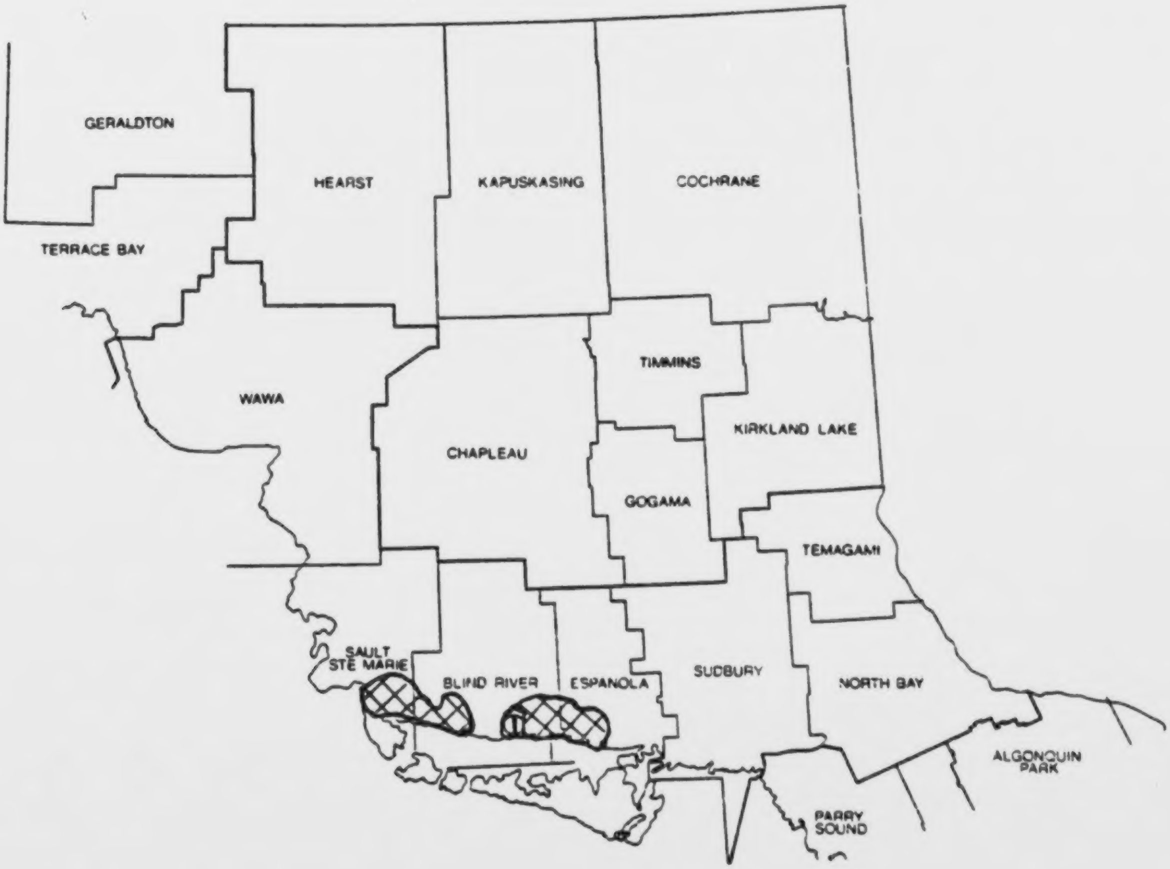
Areas within which defoliaiton occurred in 1967

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

0 Miles 60
0 Kilometres 96

Forest Tent Caterpillar

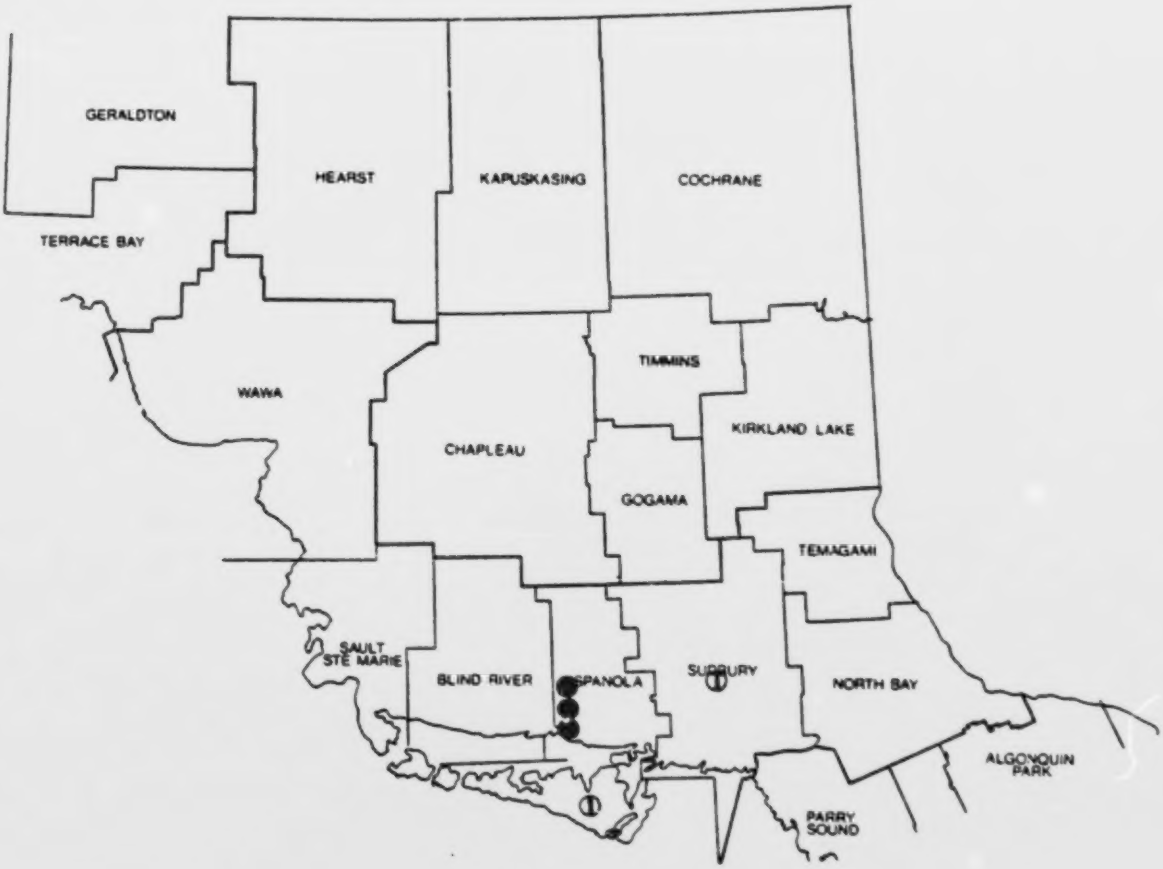
Areas within which defoliation occurred in 1968

LEGEND

Light defoliation Ⓛ

Moderate-to-severe defoliation ▨

NORTHEASTERN ONTARIO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TIMMINS
WAWA
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CHAPLEAU
GOGAMA
TEMAGAMI
SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

0 Miles 60

0 Kilometres 96

Forest Tent Caterpillar

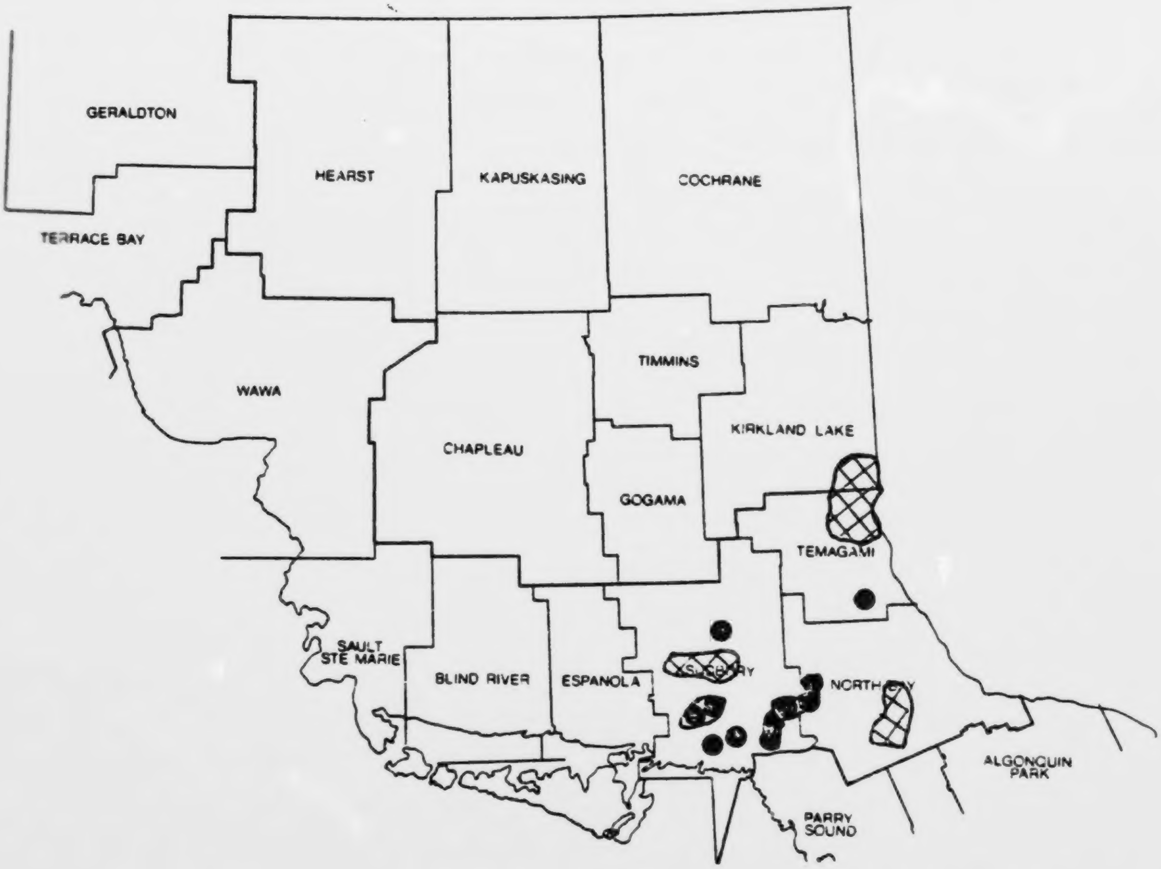
Areas within which defoliation occurred in 1969

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ●

NORTHEASTERN ONTARIO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SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

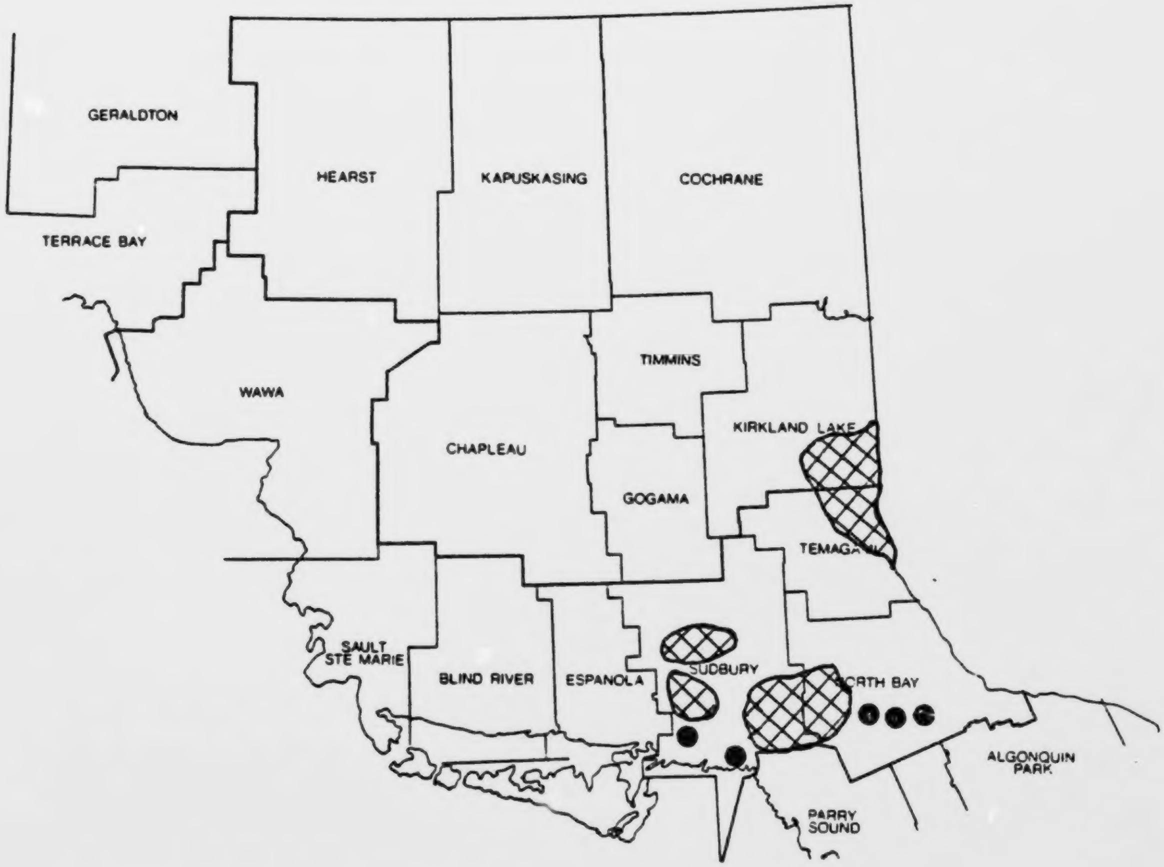
Forest Tent Caterpillar

Areas within which defoliation occurred in 1973

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
ORTH BAY
ALGONQUIN PARK
PARRY SOUND

Forest Tent Caterpillar

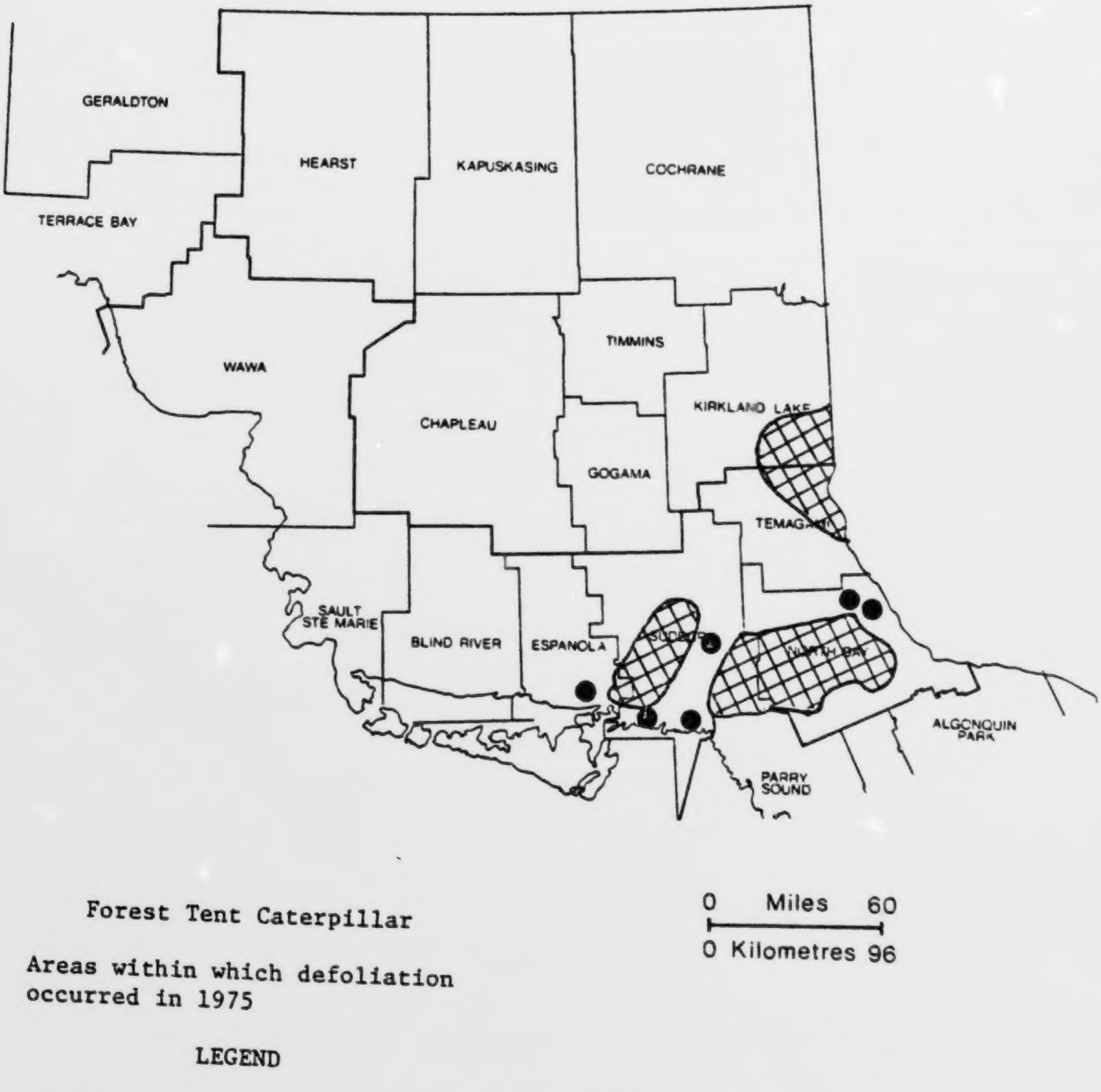
Areas within which defoliation occurred in 1974

0 Miles 60
0 Kilometres 96

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

Forest Tent Caterpillar

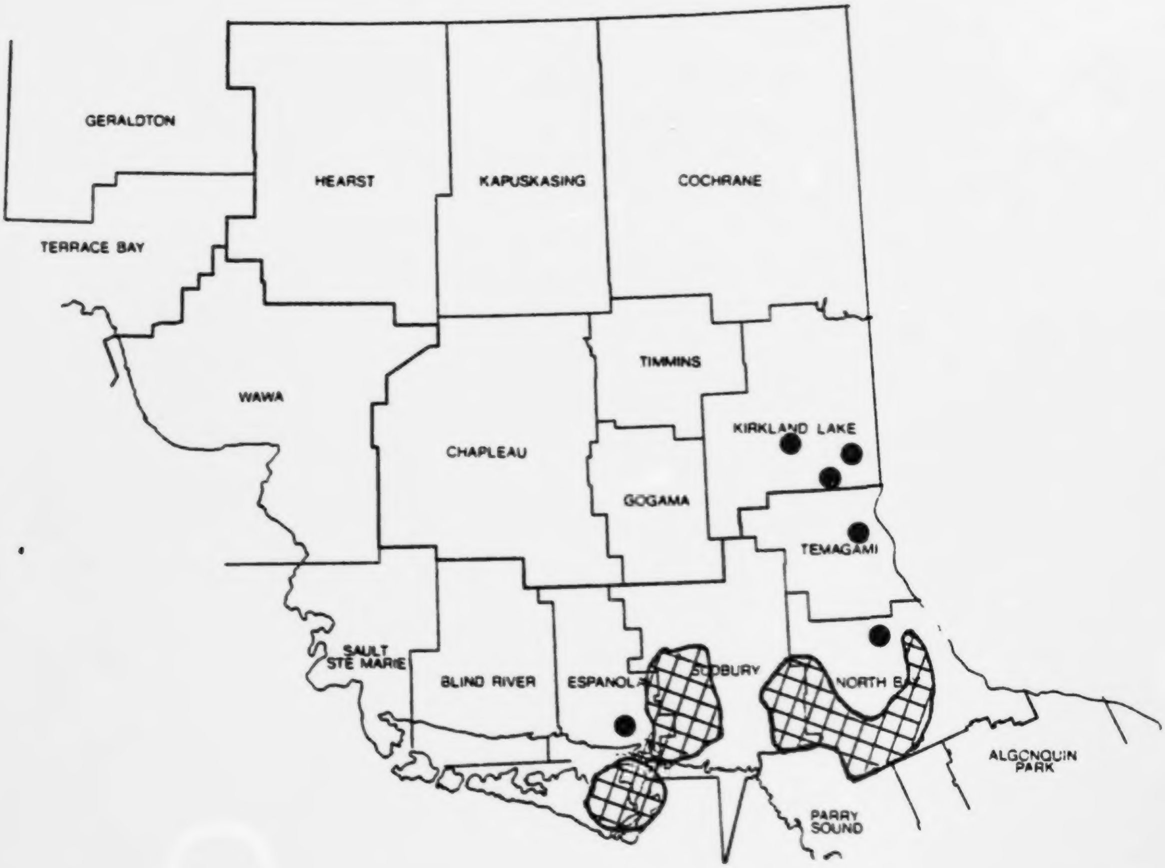
Areas within which defoliation occurred in 1975

0 Miles 60
0 Kilometres 96

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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TEMAGAMI
SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

0 Miles 60
0 Kilometres 96

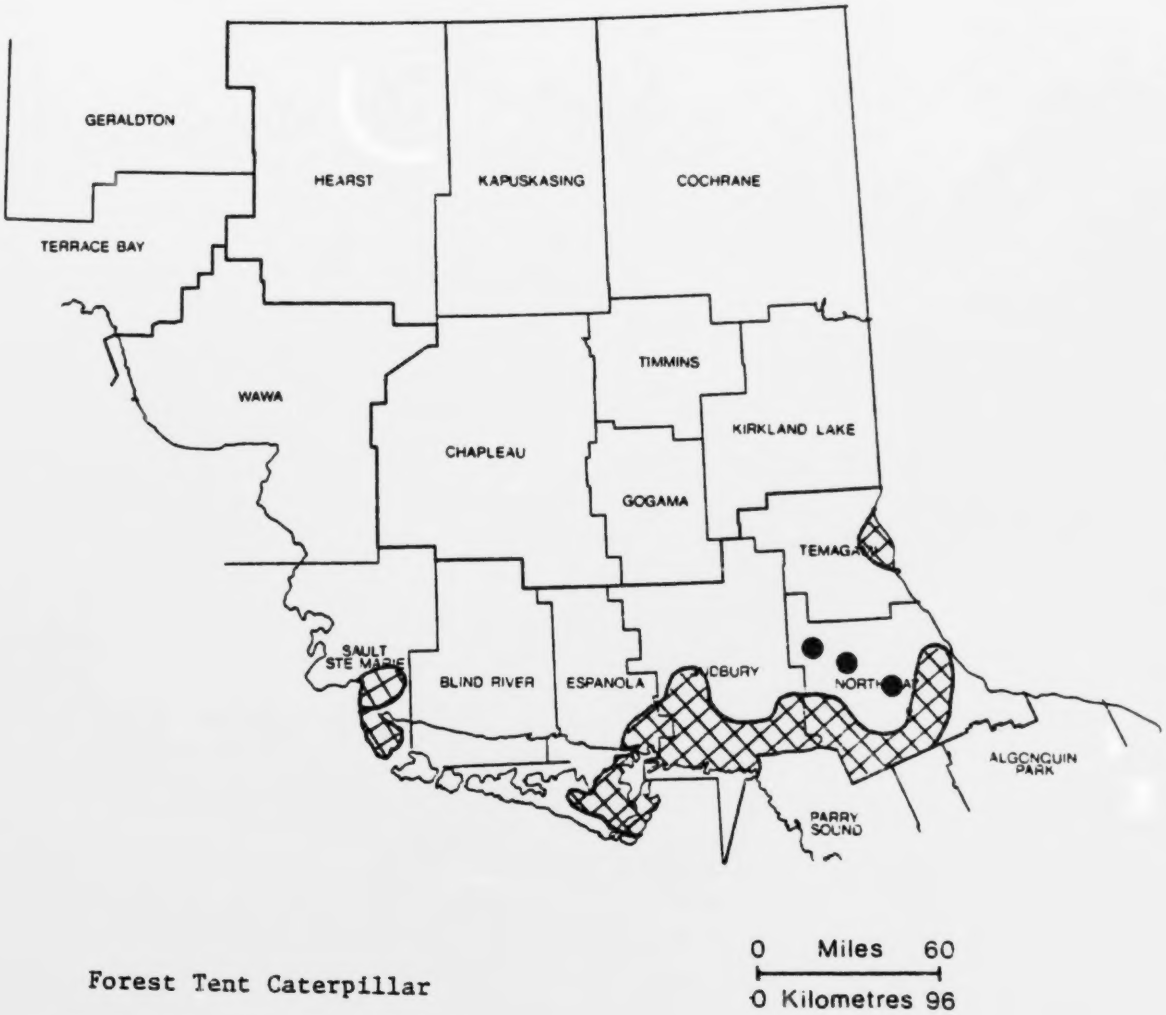
Forest Tent Caterpillar

Areas within which defoliation occurred in 1976

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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GOGAMA
TEMAGA
SAULT STE MA
BLIND RIVER
ESPANOLA
DBURY
NORTH
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

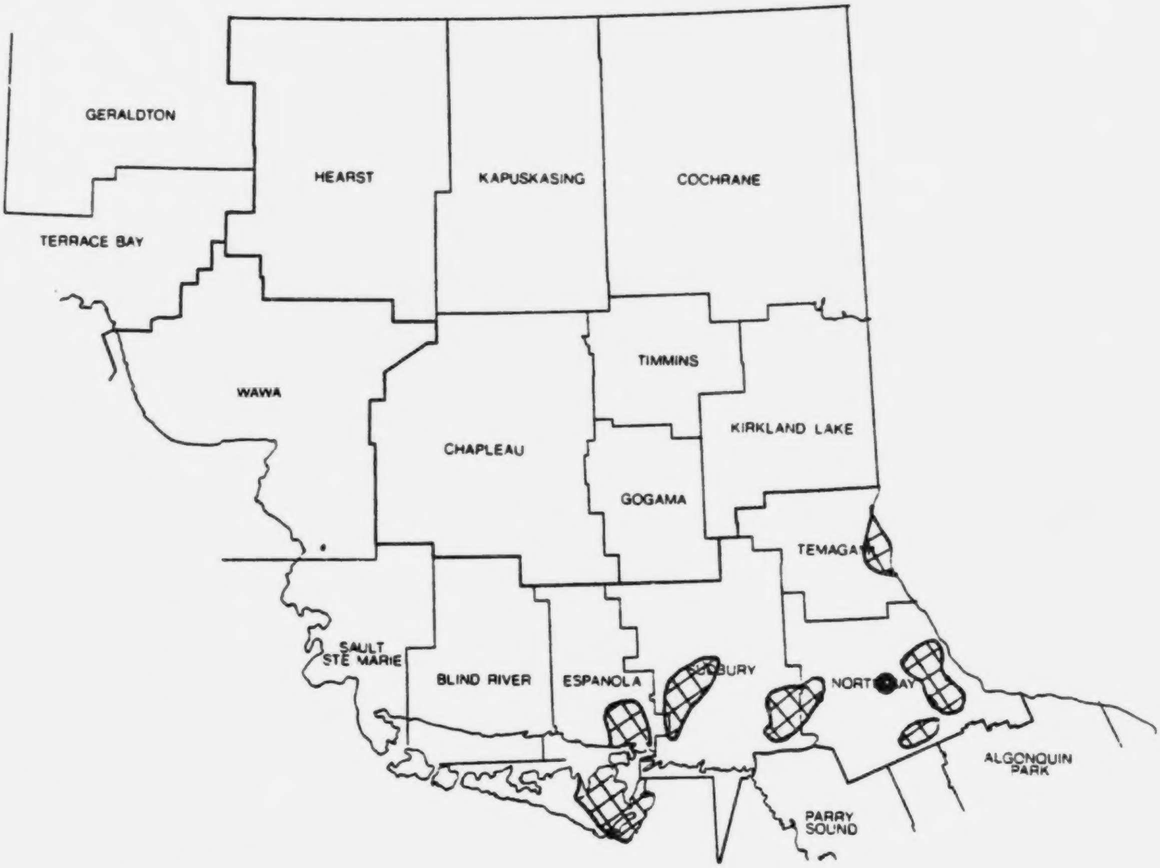
Forest Tent Caterpillar

Areas within which defoliation
occurred in 1977

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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GOGAMA
TEMAGAMI
SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

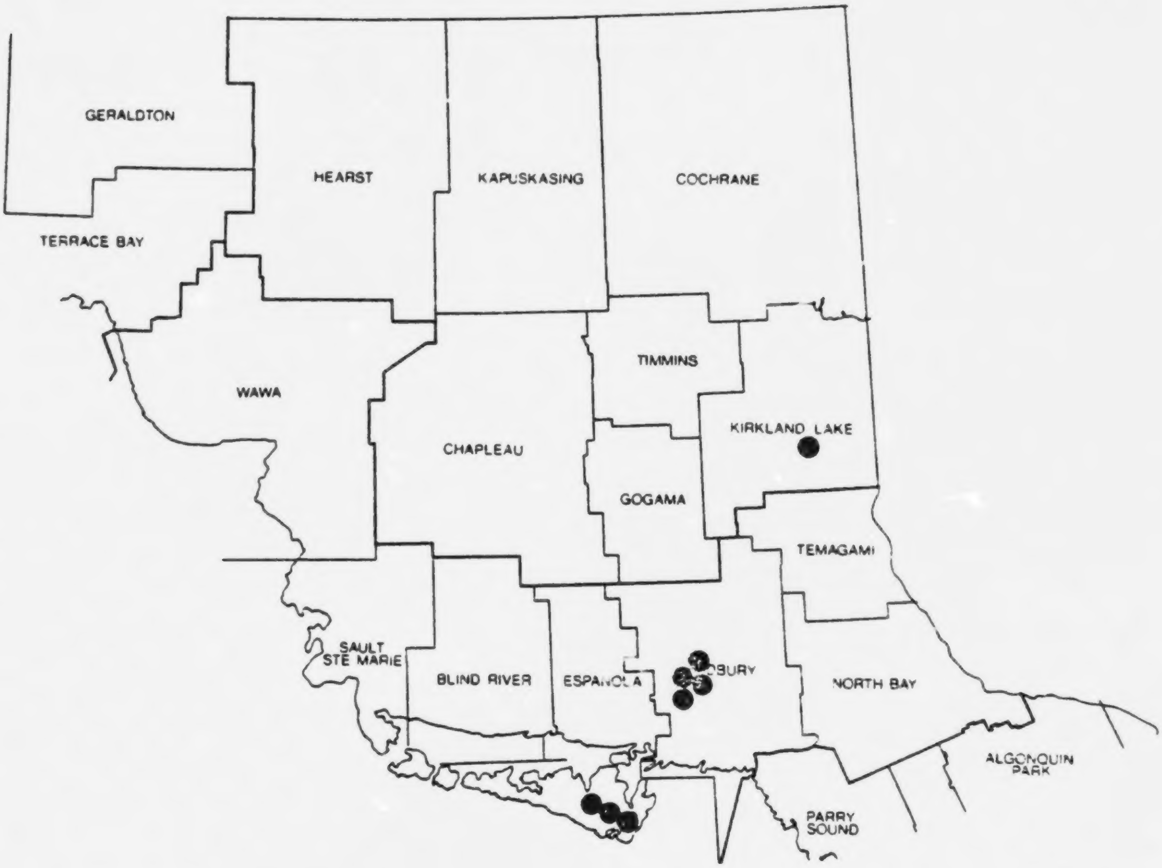
Forest Tent Caterpillar

Areas within which defoliation
occurred in 1978

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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GOGAMA
TEMAGAMI
SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

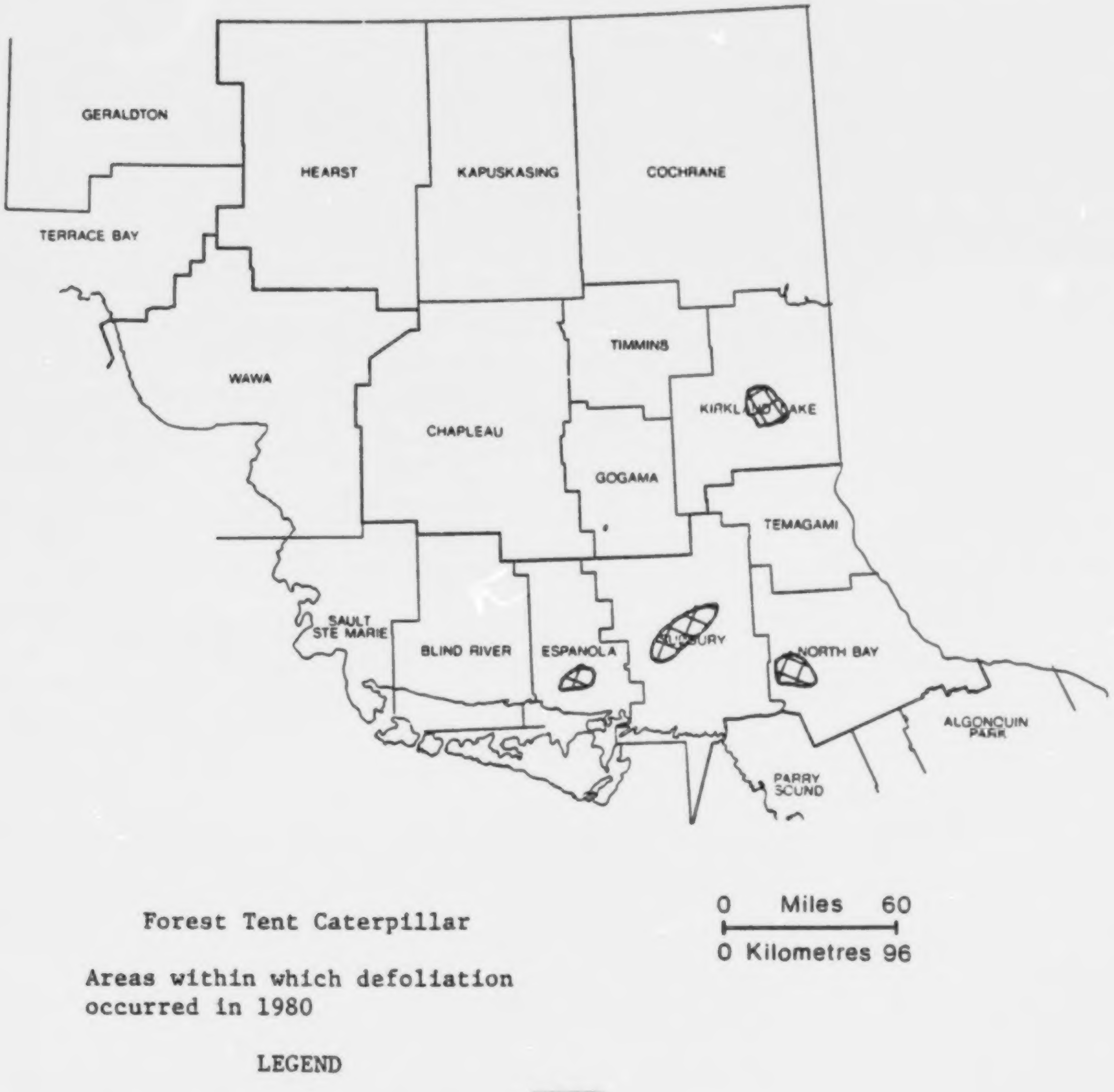
Forest Tent Caterpillar

Areas within which defoliation occurred in 1979

LEGEND

Moderate-to-severe defoliation ●

NORTHEASTERN ONTARIO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GOGAMA
TEMAGAMI
SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

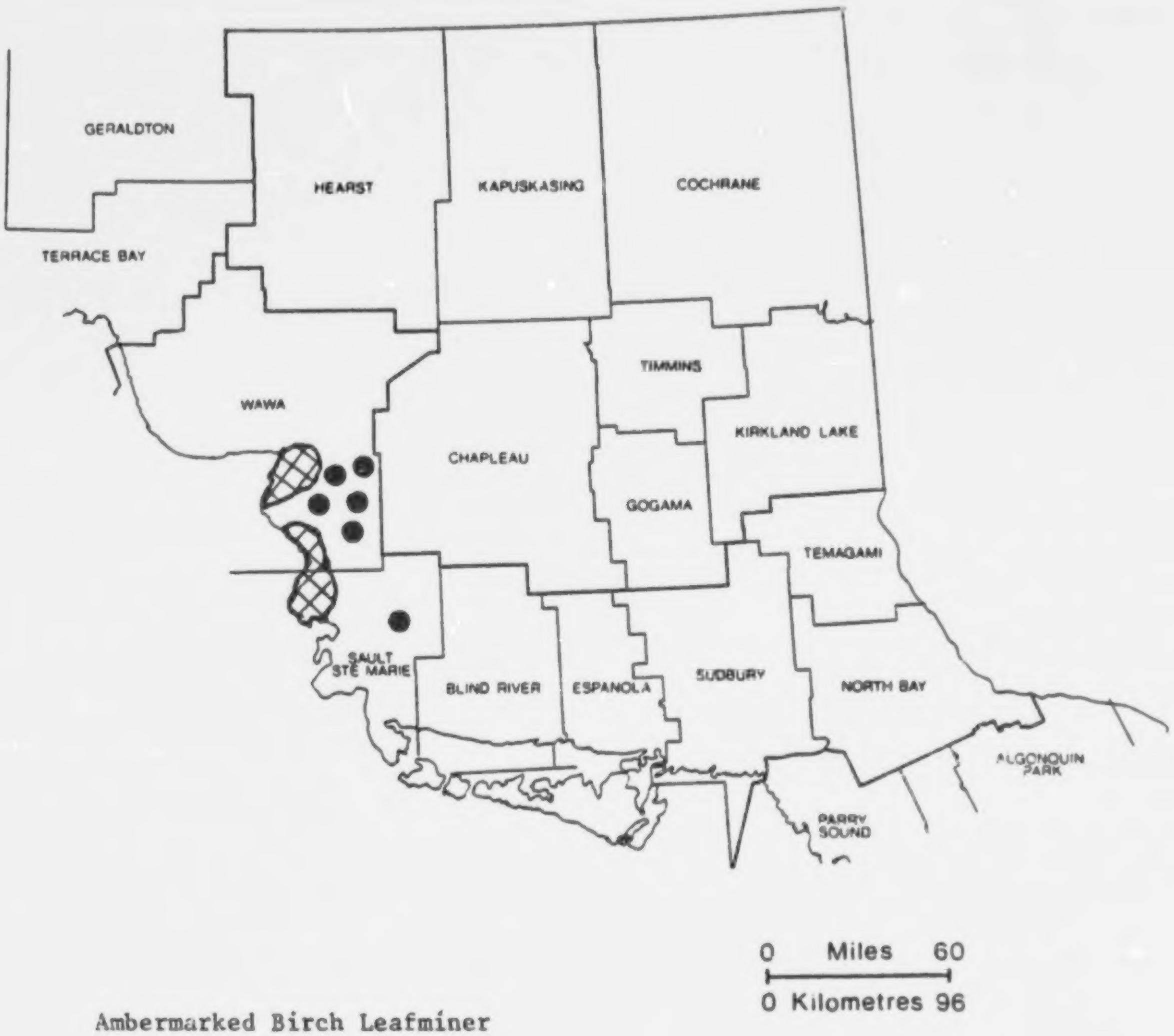
Forest Tent Caterpillar

Areas within which defoliation occurred in 1980

LEGEND

Moderate-to-severe defoliation ⊠

NORTHEASTERN ONTARIO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GOGAMA
TEMAGAMI
SAULT STE MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND
0 Miles 60
0 Kilometres 96

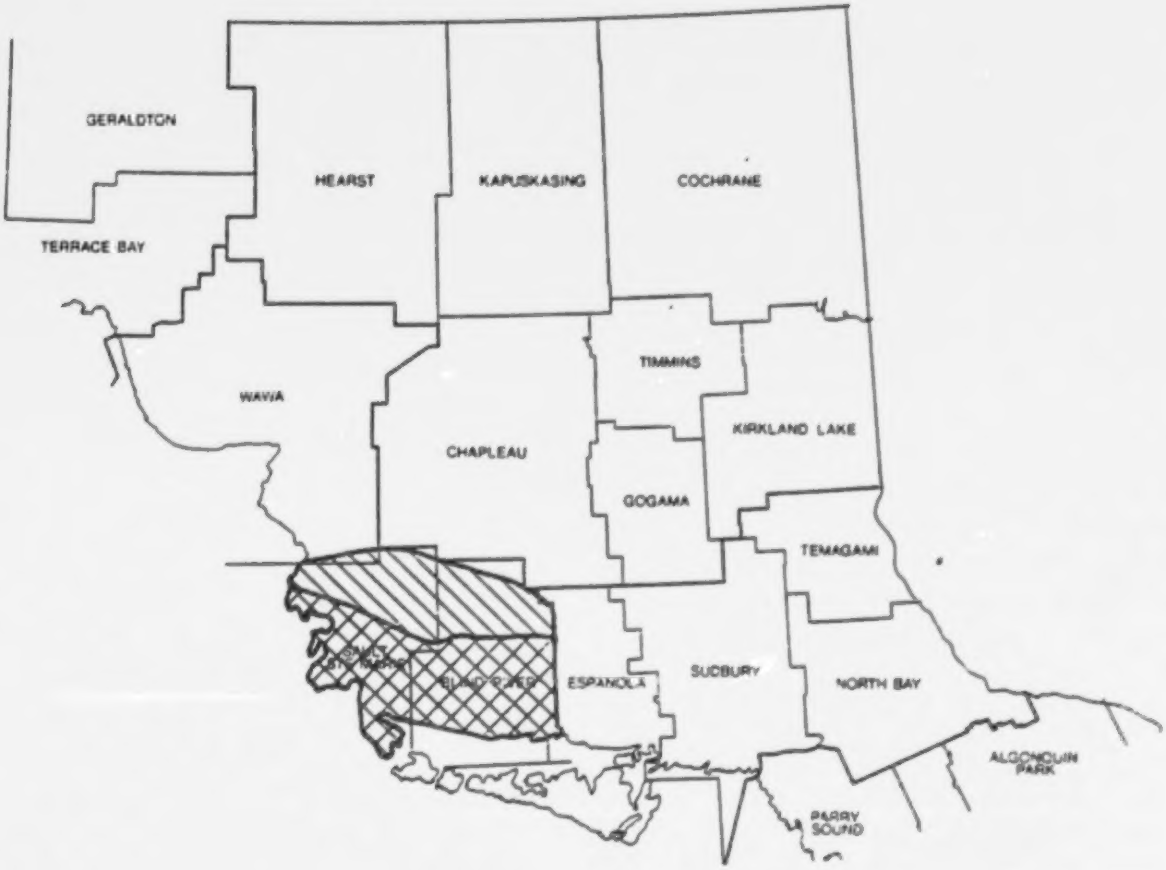
Ambermarked Birch Leafminer

Areas with which defoliation occurred in 1958

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO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TEMAGAMI
SAULT STE. MARIE
BLIND RIVER
ESPANOLA
SUDBURY
NORTH BAY
ALGONQUIN PARK
PARRY SOUND

0 Miles 60
0 Kilometres 96

Ambermarked Birch Leafminer

Areas within which defoliation occurred in 1960

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ▦